Service Manual

ProCore® SR Series

Preface

The purpose of this publication is to provide the service technician with information for troubleshooting, testing and repair of major systems and components on the ProCore SR series deep tine aerators: models SR48, SR54, SR54–S, SR70, SR70–S, SR72 and SR75.

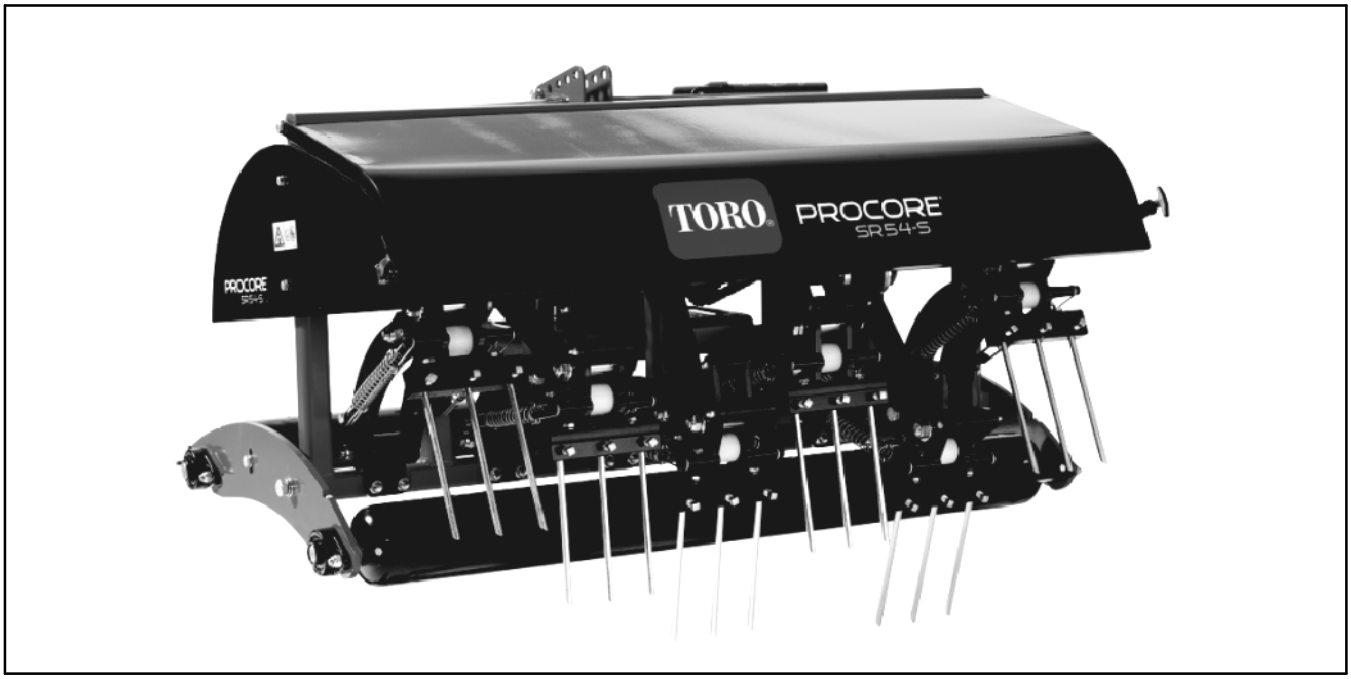
REFER TO THE OPERATOR'S MANUAL FOR OPERATING, MAINTENANCE AND ADJUSTMENT INSTRUCTIONS. For reference, insert a copy of the Operator's Manuals and Parts Catalog for your machine into Chapter 2 of this service manual. Additional copies of the Operator's Manuals and Parts Catalog are available on the internet at www.Toro.com.

The Toro Company reserves the right to change product specifications or this publication without notice.

This safety symbol means DANGER, WARNING, or CAUTION, PERSONAL SAFETY INSTRUCTION. When you see this symbol, carefully read the instructions that follow. Failure to obey the instructions may result in personal injury.

NOTE: A **NOTE** will give general information about the correct operation, maintenance, service, testing or repair of the machine.

IMPORTANT: The IMPORTANT notice will give important instructions which must be followed to prevent damage to systems or components on the machine.



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Chapter 1

Safety

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Safety Instructions

The ProCore SR series of deep tine aerators are designed and tested to offer safe service when operated and maintained properly. Although hazard control and accident prevention partially are dependent upon the design and configuration of the machine, these factors are also dependent upon the awareness, concern and proper training of the personnel involved in the operation, transport, maintenance and storage of the machine. Improper use or maintenance of the machine can result in injury or death. To reduce the potential for injury or death, comply with the following safety instructions.

WARNING

To reduce the potential for injury or death, comply with the following safety instructions.

Before Operating

1. Review and understand the contents of the Operator's Manual before starting and operating the vehicle. Become familiar with the controls and know how to stop the vehicle and engine quickly. Additional copies of the Operator's Manual are available on the internet at www.Toro.com.

2. Keep all shields, safety devices and decals in place. If a shield, safety device or decal is defective, illegible or damaged, repair or replace it before operating the machine.

3. Make sure that the tractor is carefully selected to assure the best performance and safe operation of the ProCore deep tine aerator.

4. Make sure that operator is familiar with safe tractor operation.

5. Tighten any loose nuts, bolts or screws to ensure machine is in safe operating condition.

6. Make sure that the ProCore deep tine aerator is properly attached to tractor.

While Operating

IMPORTANT: To prevent damage to your ProCore aerator during operation:
- **Never operate ProCore aerator without tine heads installed.**
- **Do not operate the tractor in reverse when the ProCore aerator is lowered.**
- **Make sure aerator roller is on ground before operating aerator. Never operate with the aerator in the raised position.**
- **Never operate the tractor PTO in excess of 500 RPM.**

1. Operator should be on the tractor when starting the engine and when operating the aerator. Stay away from the aerator coring head when it is engaged.

2. Before starting the engine on the tractor:

   A. Apply the parking brake.

   B. Make sure traction lever or transmission is in neutral and PTO is disengaged.

   C. Refer to Tractor Operator's Manual for safe starting procedures.

3. Do not run tractor engine in a confined area without adequate ventilation. Exhaust fumes are hazardous and could possibly be deadly.

4. If abnormal aerator vibration is detected, disengage PTO and stop tractor immediately. Determine source of vibration and correct problem(s) before resuming the use of aerator.

5. While operating, the combination of the tractor and the ProCore aerator may exceed noise levels of 85dB(A) at the operator position. Hearing protection is recommended for prolonged exposure to reduce the potential of permanent hearing damage.

6. Before leaving the operator's position of the tractor:

   A. Disengage PTO power to aerator and lower aerator to the ground.

   B. Apply parking brake on tractor. Stop engine and remove key from ignition switch.

   C. Wait for all moving parts to stop before leaving the tractor.

Maintenance and Service

1. The Operator's Manual provides information regarding the operation, general maintenance and maintenance intervals for your ProCore aerator. Refer to this publication for additional information when servicing the machine.

2. Before servicing or making adjustments to aerator, disengage tractor PTO, position aerator on a level surface and lower aerator to the ground. Apply tractor parking brake, stop engine and remove key from the ignition switch.

3. Make sure machine is in safe operating condition by keeping all nuts, bolts and screws tight.

4. Use care when checking or servicing the coring head: wear gloves and use caution.

5. Never step over the PTO shaft to reach other side of aerator. Walk around the machine instead.

6. The friction clutch on the PTO driveshaft may become hot during use. Make sure that clutch has cooled before performing any service on the driveshaft.

7. Before disconnecting aerator from tractor, install storage stand to aerator frame and park aerator on a hard, level surface.

8. After servicing the aerator, be sure that all guards and covers are properly installed and secured.

9. At the time of manufacture, the machine conformed to all applicable safety standards. To assure optimum performance and continued safety certification of the machine, use genuine Toro replacement parts and accessories. Replacement parts and accessories made by other manufacturers may result in non-conformance with the safety standards, and the warranty may be voided.

10. If major repairs are ever needed or assistance is desired, contact an Authorized Toro Distributor.

Safety and Instruction Decals

Numerous safety and instruction decals are affixed to the ProCore SR series deep tine aerator. If any decal becomes illegible or damaged, install a new decal. Part numbers for replacement decals are listed in your Parts Catalog. Order replacement decals from your Authorized Toro Distributor.

Chapter 2

Product Records and Maintenance

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Product Records

Insert Operator's Manual and Parts Catalog for your ProCore SR Series deep tine aerator at the end of this chapter. Additionally, if any optional equipment or accessories have been installed to your ProCore, insert the Installation Instructions, Operator's Manuals and Parts Catalogs for those options at the end of this chapter.

Maintenance

Maintenance procedures and recommended service intervals for the ProCore SR Series deep tine aerator are covered in the Operator's Manual. Refer to that publication when performing regular equipment maintenance.

Equivalents and Conversions

Decimal and Millimeter Equivalents

Fractions	Decimals	mm	Fractions	Decimals	mm
1/64	0.015625	— 0.397	33/64	0.515625	— 13.097
1/32	0.03125	— 0.794	17/32	0.53125	— 13.494
3/64	0.046875	— 1.191	35/64	0.546875	— 13.891
1/16	0.0625	— 1.588	9/16	0.5625	— 14.288
5/64	0.078125	— 1.984	37/64	0.578125	— 14.684
3/32	0.09375	— 2.381	19/32	0.59375	— 15.081
7/64	0.109275	— 2.778	39/64	0.609375	— 15.478
1/8	0.1250	— 3.175	**5/8**	0.6250	— 15.875
9/64	0.140625	— 3.572	41/64	0.640625	— 16.272
5/32	0.15625	— 3.969	21/32	0.65625	— 16.669
11/64	0.171875	— 4.366	43/64	0.671875	— 17.066
3/16	0.1875	— 4.762	11/16	0.6875	— 17.462
13/64	0.203125	— 5.159	45/64	0.703125	— 17.859
7/32	0.21875	— 5.556	23/32	0.71875	— 18.256
15/64	0.234375	— 5.953	47/64	0.734375	— 18.653
1/4	0.2500	— 6.350	**3/4**	0.7500	— 19.050
17/64	0.265625	— 6.747	49/64	0.765625	— 19.447
9/32	0.28125	— 7.144	25/32	0.78125	— 19.844
19/64	0.296875	— 7.541	51/64	0.796875	— 20.241
5/16	0.3125	— 7.938	13/16	0.8125	— 20.638
21/64	0.328125	— 8.334	53/64	0.828125	— 21.034
11/32	0.34375	— 8.731	27/32	0.84375	— 21.431
23/64	0.359375	— 9.128	55/64	0.859375	— 21.828
3/8	0.3750	— 9.525	**7/8**	0.8750	— 22.225
25/64	0.390625	— 9.922	57/64	0.890625	— 22.622
13/32	0.40625	— 10.319	29/32	0.90625	— 23.019
27/64	0.421875	— 10.716	59/64	0.921875	— 23.416
7/16	0.4375	— 11.112	15/16	0.9375	— 23.812
29/64	0.453125	— 11.509	61/64	0.953125	— 24.209
15/32	0.46875	— 11.906	31/32	0.96875	— 24.606
31/64	0.484375	— 12.303	63/64	0.984375	— 25.003
1/2	0.5000	— 12.700	**1**	1.000	— 25.400

1 mm = 0.03937 in. **0.001 in. = 0.0254 mm**

U.S.to Metric Conversions

	To Convert	Into	Multiply By
Linear Measurement	Miles	Kilometers	1.609
	Yards	Meters	0.9144
	Feet	Meters	0.3048
	Feet	Centimeters	30.48
	Inches	Meters	0.0254
	Inches	Centimeters	2.54
	Inches	Millimeters	25.4
Area	Square Miles	Square Kilometers	2.59
	Square Feet	Square Meters	0.0929
	Square Inches	Square Centimeters	6.452
	Acre	Hectare	0.4047
Volume	Cubic Yards	Cubic Meters	0.7646
	Cubic Feet	Cubic Meters	0.02832
	Cubic Inches	Cubic Centimeters	16.39
Weight	Tons (Short)	Metric Tons	0.9078
	Pounds	Kilograms	0.4536
	Ounces (Avdp.)	Grams	28.3495
Pressure	Pounds/Sq. In.	Kilopascal	6.895
	Pounds/Sq. In.	Bar	0.069
Work	Foot-pounds	Newton-Meters	1.356
	Foot-pounds	Kilogram-Meters	0.1383
	Inch-pounds	Kilogram-Centimeters	1.152144
Liquid Volume	Quarts	Liters	0.9463
	Gallons	Liters	3.785
Liquid Flow	Gallons/Minute	Liters/Minute	3.785
Temperature	Fahrenheit	Celsius	1. Subract 32° 2. Multiply by 5/9

Torque Specifications

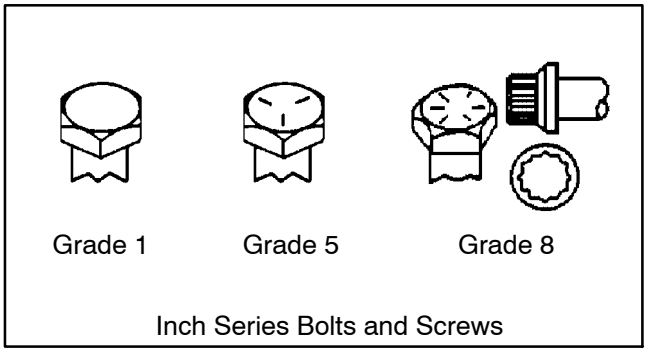
Recommended fastener torque values are listed in the following tables. For critical applications, as determined by Toro, either the recommended torque or a torque that is unique to the application is clearly identified and specified in this Service Manual.

These Torque Specifications for the installation and tightening of fasteners shall apply to all fasteners which do not have a specific requirement identified in this Service Manual. The following factors shall be considered when applying torque: cleanliness of the fastener, use of a thread sealant (e.g. Loctite), degree of lubrication on the fastener, presence of a prevailing torque feature, hardness of the surface underneath the fastener's head or similar condition which affects the installation.

As noted in the following tables, torque values should be **reduced by 25% for lubricated fasteners** to achieve the similar stress as a dry fastener. Torque values may also have to be reduced when the fastener is threaded into aluminum or brass. The specific torque value should be determined based on the aluminum or brass material strength, fastener size, length of thread engagement, etc.

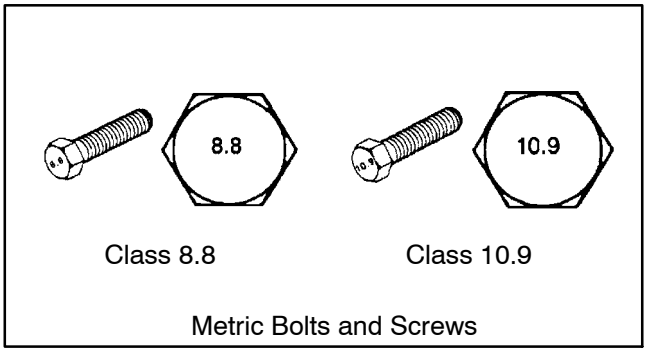
The standard method of verifying torque shall be performed by marking a line on the fastener (head or nut) and mating part, then back off fastener 1/4 of a turn. Measure the torque required to tighten the fastener until the lines match up.

Fastener Identification



Inch Series Bolts and Screws

Figure 1



Metric Bolts and Screws

Figure 2

Standard Torque for Dry, Zinc Plated and Steel Fasteners (Inch Series)

Thread Size	Grade 1, 5 & 8 with Thin Height Nuts	SAE Grade 1 Bolts, Screws, Studs & Sems with Regular Height Nuts (SAE J995 Grade 2 or Stronger Nuts)		SAE Grade 5 Bolts, Screws, Studs & Sems with Regular Height Nuts (SAE J995 Grade 2 or Stronger Nuts)		SAE Grade 8 Bolts, Screws, Studs & Sems with Regular Height Nuts (SAE J995 Grade 5 or Stronger Nuts)	
	in-lb	**in-lb**	**N-cm**	**in-lb**	**N-cm**	**in-lb**	**N-cm**
# 6 - 32 UNC	10 ± 2	13 ± 2	147 ± 23	15 ± 2	170 ± 20	23 ± 2	260 ± 20
# 6 - 40 UNF				17 ± 2	190 ± 20	25 ± 2	280 ± 20
# 8 - 32 UNC	13 ± 2	25 ± 5	282 ± 30	29 ± 3	330 ± 30	41 ± 4	460 ± 45
# 8 - 36 UNF				31 ± 3	350 ± 30	43 ± 4	485 ± 45
# 10 - 24 UNC	18 ± 2	30 ± 5	339 ± 56	42 ± 4	475 ± 45	60 ± 6	675 ± 70
# 10 - 32 UNF				48 ± 4	540 ± 45	68 ± 6	765 ± 70
1/4 - 20 UNC	48 ± 7	53 ± 7	599 ± 79	100 ± 10	1125 ± 100	140 ± 15	1580 ± 170
1/4 - 28 UNF	53 ± 7	65 ± 10	734 ± 113	115 ± 10	1300 ± 100	160 ± 15	1800 ± 170
5/16 - 18 UNC	115 ± 15	105 ± 17	1186 ± 169	200 ± 25	2250 ± 280	300 ± 30	3390 ± 340
5/16 - 24 UNF	138 ± 17	128 ± 17	1446 ± 192	225 ± 25	2540 ± 280	325 ± 30	3670 ± 340
	ft-lb	**ft-lb**	**N-m**	**ft-lb**	**N-m**	**ft-lb**	**N-m**
3/8 - 16 UNC	16 ± 2	16 ± 2	22 ± 3	30 ± 3	41 ± 4	43 ± 4	58 ± 5
3/8 - 24 UNF	17 ± 2	18 ± 2	24 ± 3	35 ± 3	47 ± 4	50 ± 4	68 ± 5
7/16 - 14 UNC	27 ± 3	27 ± 3	37 ± 4	50 ± 5	68 ± 7	70 ± 7	95 ± 9
7/16 - 20 UNF	29 ± 3	29 ± 3	39 ± 4	55 ± 5	75 ± 7	77 ± 7	104 ± 9
1/2 - 13 UNC	30 ± 3	48 ± 7	65 ± 9	75 ± 8	102 ± 11	105 ± 10	142 ± 14
1/2 - 20 UNF	32 ± 3	53 ± 7	72 ± 9	85 ± 8	115 ± 11	120 ± 10	163 ± 14
5/8 - 11 UNC	65 ± 10	88 ± 12	119 ± 16	150 ± 15	203 ± 20	210 ± 20	285 ± 27
5/8 - 18 UNF	75 ± 10	95 ± 15	129 ± 20	170 ± 15	230 ± 20	240 ± 20	325 ± 27
3/4 - 10 UNC	93 ± 12	140 ± 20	190 ± 27	265 ± 25	359 ± 34	375 ± 35	508 ± 47
3/4 - 16 UNF	115 ± 15	165 ± 25	224 ± 34	300 ± 25	407 ± 34	420 ± 35	569 ± 47
7/8 - 9 UNC	140 ± 20	225 ± 25	305 ± 34	430 ± 45	583 ± 61	600 ± 60	813 ± 81
7/8 - 14 UNF	155 ± 25	260 ± 30	353 ± 41	475 ± 45	644 ± 61	660 ± 60	895 ± 81

NOTE: Reduce torque values listed in the table above by 25% for lubricated fasteners. Lubricated fasteners are defined as threads coated with a lubricant such as oil, graphite or thread sealant such as Loctite.

NOTE: Torque values may have to be reduced when installing fasteners into threaded aluminum or brass. The specific torque value should be determined based on the fastener size, the aluminum or base material strength, length of thread engagement, etc.

NOTE: The nominal torque values listed above for Grade 5 and 8 fasteners are based on 75% of the minimum proof load specified in SAE J429. The tolerance is approximately ± 10% of the nominal torque value. Thin height nuts include jam nuts.

Standard Torque for Dry, Zinc Plated and Steel Fasteners (Metric Fasteners)

Thread Size	Class 8.8 Bolts, Screws and Studs with Regular Height Nuts (Class 8 or Stronger Nuts)		Class 10.9 Bolts, Screws and Studs with Regular Height Nuts (Class 10 or Stronger Nuts)	
M5 X 0.8	57 ± 5 in-lb	640 ± 60 N-cm	78 ± 7 in-lb	885 ± 80 N-cm
M6 X 1.0	96 ± 9 in-lb	1018 ± 100 N-cm	133 ± 13 in-lb	1500 ± 150 N-cm
M8 X 1.25	19 ± 2 ft-lb	26 ± 3 N-m	27 ± 2 ft-lb	36 ± 3 N-m
M10 X 1.5	38 ± 4 ft-lb	52 ± 5 N-m	53 ± 5 ft-lb	72 ± 7 N-m
M12 X 1.75	66 ± 7 ft-lb	90 ± 10 N-m	92 ± 9 ft-lb	125 ± 12 N-m
M16 X 2.0	166 ± 15 ft-lb	225 ± 20 N-m	229 ± 22 ft-lb	310 ± 30 N-m
M20 X 2.5	325 ± 33 ft-lb	440 ± 45 N-m	450 ± 37 ft-lb	610 ± 50 N-m

NOTE: Reduce torque values listed in the table above by 25% for lubricated fasteners. Lubricated fasteners are defined as threads coated with a lubricant such as oil, graphite or thread sealant such as Loctite.

NOTE: Torque values may have to be reduced when installing fasteners into threaded aluminum or brass. The specific torque value should be determined based on the fastener size, the aluminum or base material strength, length of thread engagement, etc.

NOTE: The nominal torque values listed above are based on 75% of the minimum proof load specified in SAE J1199. The tolerance is approximately ± 10% of the nominal torque value.

Other Torque Specifications

SAE Grade 8 Steel Set Screws

Thread Size	Recommended Torque	
	Square Head	Hex Socket
1/4 – 20 UNC	140 ± 20 in-lb	73 ± 12 in-lb
5/16 – 18 UNC	215 ± 35 in-lb	145 ± 20 in-lb
3/8 – 16 UNC	35 ± 10 ft-lb	18 ± 3 ft-lb
1/2 – 13 UNC	75 ± 15 ft-lb	50 ± 10 ft-lb

Wheel Bolts and Lug Nuts

Thread Size	Recommended Torque**	
7/16 – 20 UNF Grade 5	65 ± 10 ft-lb	88 ± 14 N-m
1/2 – 20 UNF Grade 5	80 ± 10 ft-lb	108 ± 14 N-m
M12 X 1.25 Class 8.8	80 ± 10 ft-lb	108 ± 14 N-m
M12 X 1.5 Class 8.8	80 ± 10 ft-lb	108 ± 14 N-m

** For steel wheels and non-lubricated fasteners.

Thread Cutting Screws (Zinc Plated Steel)

Type 1, Type 23 or Type F	
Thread Size	Baseline Torque*
No. 6 – 32 UNC	20 ± 5 in-lb
No. 8 – 32 UNC	30 ± 5 in-lb
No. 10 – 24 UNC	38 ± 7 in-lb
1/4 – 20 UNC	85 ± 15 in-lb
5/16 – 18 UNC	110 ± 20 in-lb
3/8 – 16 UNC	200 ± 100 in-lb

Thread Cutting Screws (Zinc Plated Steel)

Thread Size	Threads per Inch		Baseline Torque*
	Type A	Type B	
No. 6	18	20	20 ± 5 in-lb
No. 8	15	18	30 ± 5 in-lb
No. 10	12	16	38 ± 7 in-lb
No. 12	11	14	85 ± 15 in-lb

* Hole size, material strength, material thickness & finish must be considered when determining specific torque values. All torque values are based on non-lubricated fasteners.

Conversion Factors

in-lb X 11.2985 = N-cm
ft-lb X 1.3558 = N-m

N-cm X 0.08851 = in-lb
N-m X 0.7376 = ft-lb

Chapter 3

Chassis

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General Information

Operator's Manual

The Operator's Manual provides information regarding the operation, general maintenance and maintenance intervals for your ProCore aerator. Refer to this publications for additional information when servicing the machine.

Roller (ProCore SR54, SR54-S, SR70 and SR70-S)

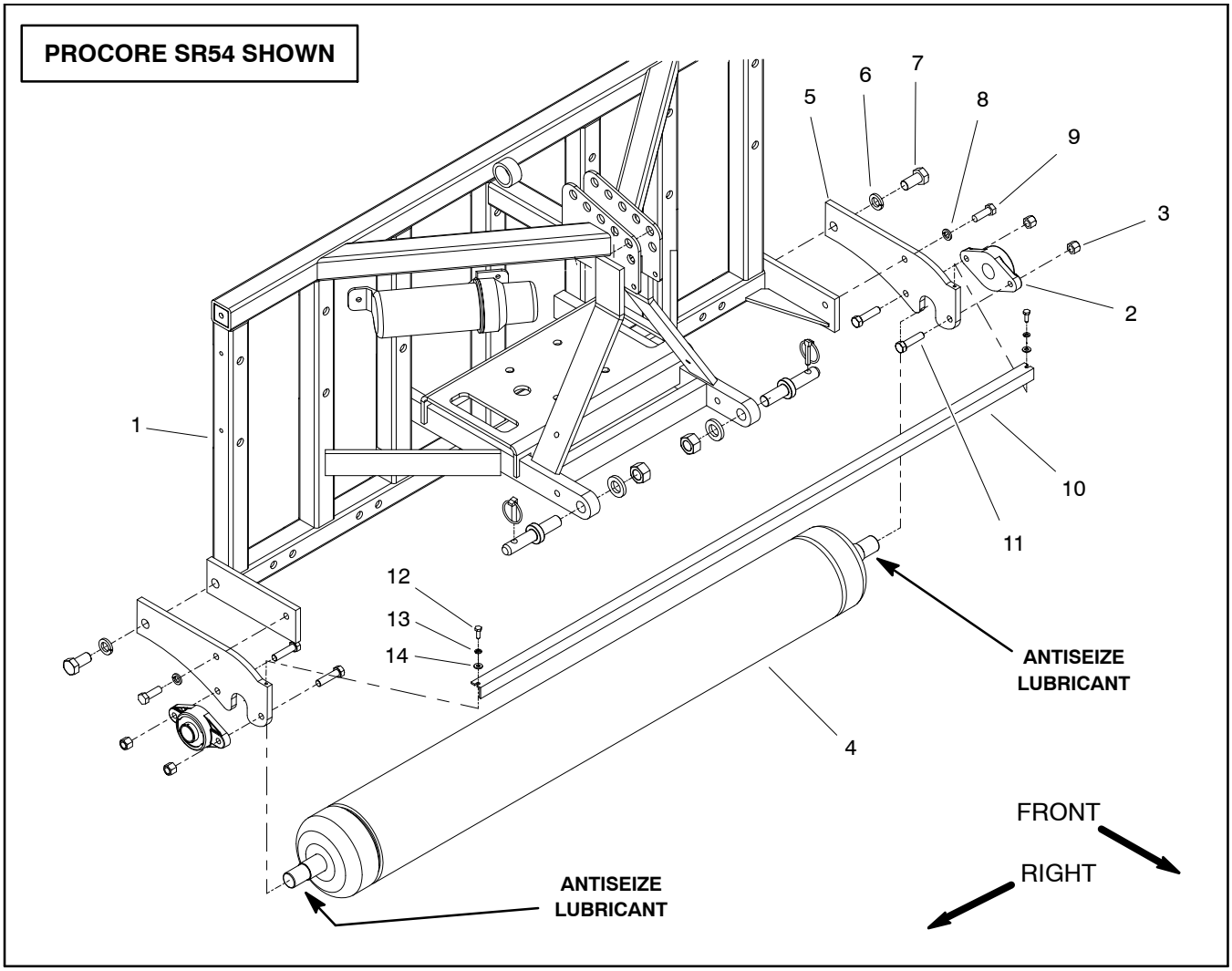


Figure 1

1. **Aerator frame**
2. **Flange bearing (2 used)**
3. **Lock nut (2 used per bearing)**
4. **Roller**
5. **Single roller boot (2 used)**
6. **Lock washer (2 used)**
7. **Cap screw (2 used)**
8. **Lock washer (2 used)**
9. **Cap screw (2 used)**
10. **Scraper**
11. **Cap screw (2 used per bearing)**
12. **Cap screw (2 used)**
13. **Lock washer (2 used)**
14. **Flat washer (2 used)**

NOTE: ProCore SR54 and SR 70 aerators use a single roller with two (2) bolt flange bearings (Fig. 1). Models SR54-S and SR70-S use two (2) rollers each supported with two (2) bolt flange bearings (Fig. 2). The procedure for removal and installation of the rollers is the same. The ProCore SR54 is shown in Figure 1.

Roller Removal (Fig. 1)

1. Position aerator on a firm, level surface with aerator attached to tractor. Disengage PTO, apply tractor parking brake, stop engine and remove key from the ignition switch.

2. Support aerator to prevent it from moving.

3. Chock roller to prevent it from moving.

4. Loosen two (2) set screws that secure each bearing locking collar to roller shaft (Fig. 3).

NOTE: On ProCore SR54–S and SR70–S aerators, the rear roller scraper is secured to the frame with cap screws that also secure the rear roller flange bearings. When removing the rear roller on these aerators, the roller scraper will be removed as well.

5. Remove cap screws and lock nuts that secure both flange bearings (item 2) to aerator frame.

6. Start engine on tractor. Slowly raise aerator while allowing roller to remain on the ground. Stop tractor engine and remove key from the ignition switch. Support raised aerator to prevent it from lowering unexpectedly.

CAUTION

To prevent personal injury, make sure that roller is supported as it is removed from the machine.

7. Remove roller with flange bearings from under machine.

8. Slide bearings from roller shaft ends.

Roller Installation (Fig. 1)

1. Clean roller shaft ends and apply antiseize lubricant to shaft ends. Slide bearings onto roller shaft ends. Do not tighten set screws in bearings at this time.

CAUTION

To prevent personal injury, make sure that roller is supported as it is installed to the machine.

2. Position roller with flange bearings under raised aerator.

NOTE: Drop speed can be adjusted on the tractor. Refer to the Tractor Operator's Manual for additional information.

3. Start engine on tractor. Slowly lower aerator to position aerator frame to roller assembly. Stop tractor engine and remove key from the ignition switch.

NOTE: On ProCore SR54–S and SR70–S aerators, make sure to install the rear roller scraper when installing the flange bearings.

4. Align holes in bearing flanges with holes in roller boot on aerator frame. Orientate bearing so that grease fittings point to front of aerator. Secure both flange bearings to frame with cap screws and lock nuts.

5. Check that roller is free to rotate and no binding exists. Center roller between bearings.

6. Apply Loctite #242 (or equivalent) to threads of bearing set screws. Tighten two (2) set screws to secure each bearing locking collar to roller shaft ends.

7. Lubricate grease fittings on bearings.

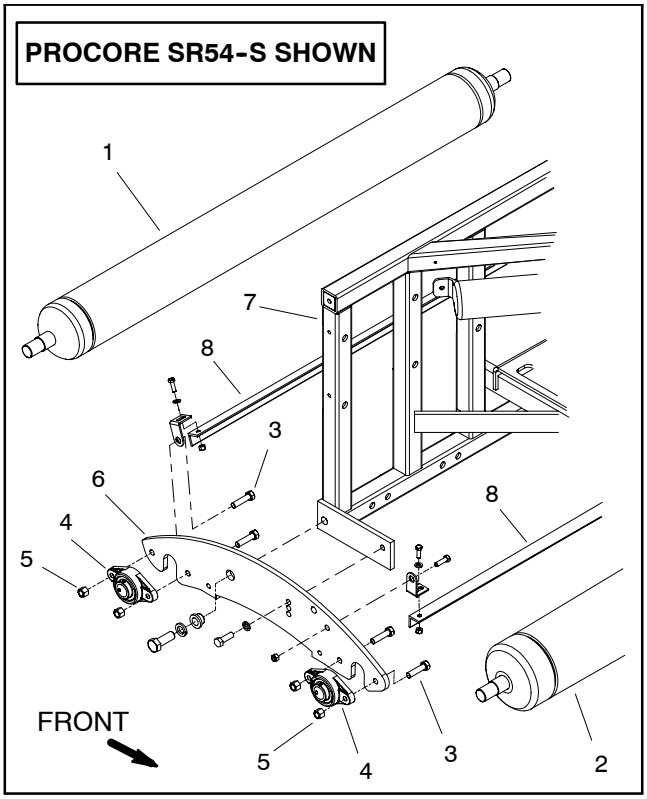


Figure 2

1. **Back roller**
2. **Main roller**
3. **Cap screw**
4. **Flange bearing**
5. **Lock nut**
6. **Double roller boot**
7. **Aerator frame**
8. **Roller scraper**

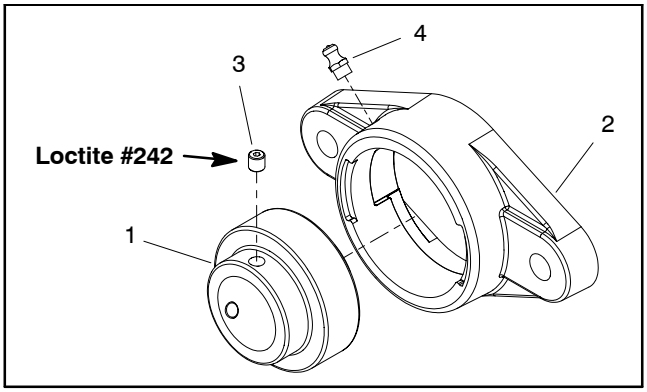


Figure 3

1. **Bearing**
2. **Bearing housing (2 bolt)**
3. **Set screw (2 used)**
4. **Grease fitting**

Roller (ProCore SR48 and SR72)

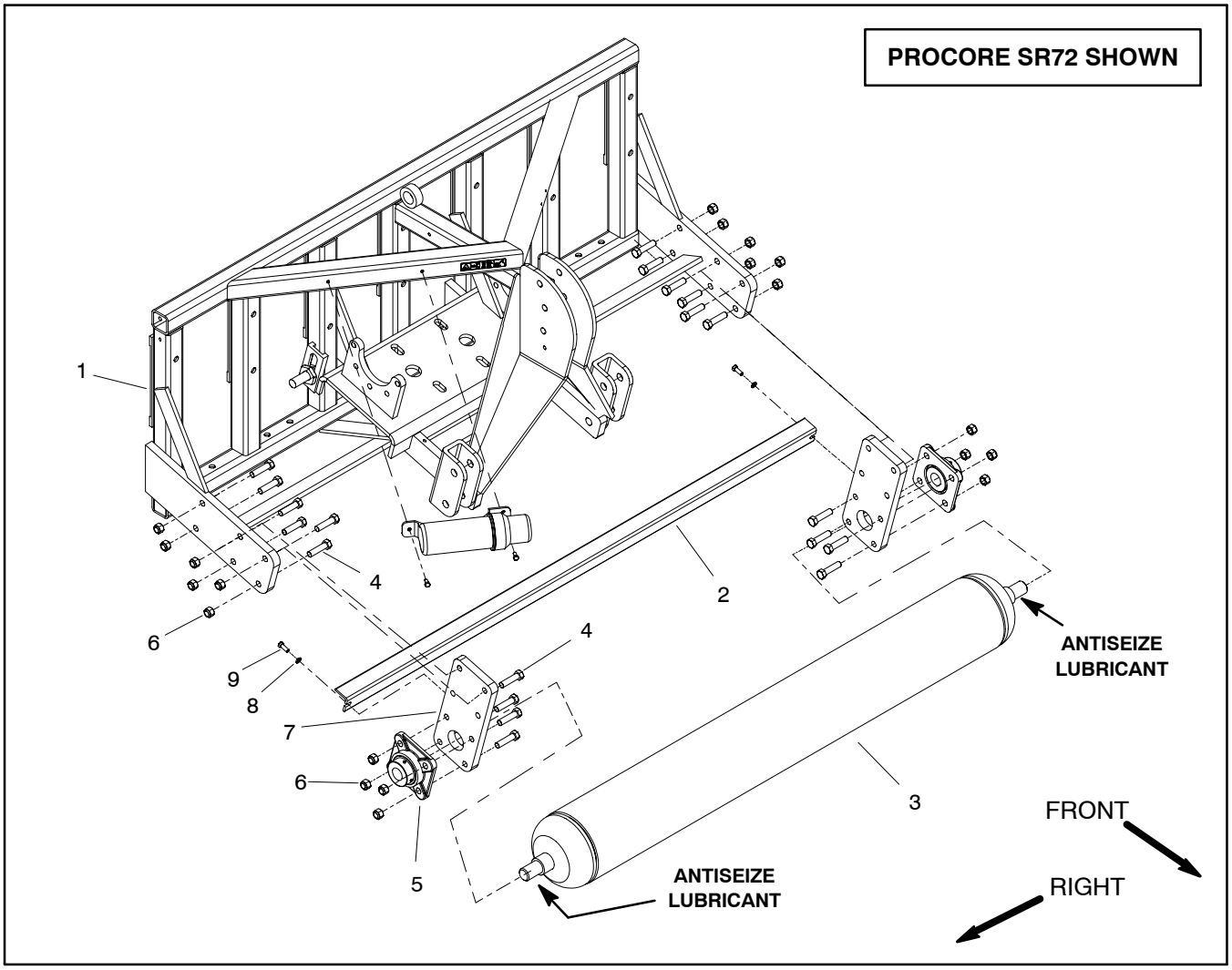


Figure 4

1. **Aerator frame**
2. **Scraper**
3. **Roller**
4. **Cap screw**
5. **Flange bearing (2 used)**
6. **Lock nut**
7. **Vertical roller bar (2 used)**
8. **Lock washer (2 used)**
9. **Cap screw (2 used)**

NOTE: The roller used on the ProCore SR48 and SR72 are very similar. The procedure for removal and installation of the roller is the same for both models. The ProCore SR72 is shown in Figure 4.

Roller Removal (Fig. 4)

1. Position aerator on a firm, level surface with aerator attached to tractor. Disengage PTO, apply tractor parking brake, stop engine and remove key from the ignition switch.

2. Support aerator to prevent it from moving.

3. Chock roller to prevent it from moving.

4. Loosen two (2) set screws that secure each bearing locking collar to roller shaft (Fig. 5).

5. Remove four (4) cap screws and lock nuts that secure both vertical roller bars (item 7) to aerator frame.

6. Start engine on tractor. Slowly raise aerator while allowing roller assembly to remain on the ground. Stop tractor engine and remove key from the ignition switch. Support raised aerator to prevent it from lowering unexpectedly.

CAUTION

To prevent personal injury, make sure that roller is supported as it is removed from the machine.

7. Remove roller with vertical roller bars and flange bearings from under machine.

8. Slide vertical roller bars and flange bearings from roller shaft ends.

9. If necessary, remove four (4) cap screws and lock nuts that secure flange bearings to vertical roller bars. Separate bearings from roller bars.

Roller Installation (Fig. 4)

1. If bearings were removed from vertical roller bars, position flange bearings to roller bars so that bearing grease fittings will point to front of aerator after installation. Secure bearings to roller bars with four (4) cap screws and lock nuts.

2. Clean roller shaft ends and apply antiseize lubricant to shaft ends. Slide vertical roller bar and flange bearing assemblies onto roller shaft ends. Do not tighten set screws in bearings at this time.

CAUTION

To prevent personal injury, make sure that roller is supported as it is installed to the machine.

3. Position roller with vertical roller bars and flange bearings under raised aerator.

NOTE: Drop speed can be adjusted on the tractor. Refer to the Tractor Operator's Manual for additional information.

4. Start engine on tractor. Slowly lower aerator to position aerator frame to roller assembly. Stop tractor engine and remove key from the ignition switch.

5. Align holes in vertical roller bars with holes in aerator frame. Make sure that bearing grease fittings point to front of aerator. Secure both roller bars to frame with four (4) cap screws and lock nuts.

6. Check that roller is free to rotate and no binding exists. Center roller between bearings.

7. Apply Loctite #242 (or equivalent) to threads of bearing set screws. Tighten two (2) set screws to secure each bearing locking collar to roller shaft.

8. Lubricate grease fittings on bearings.

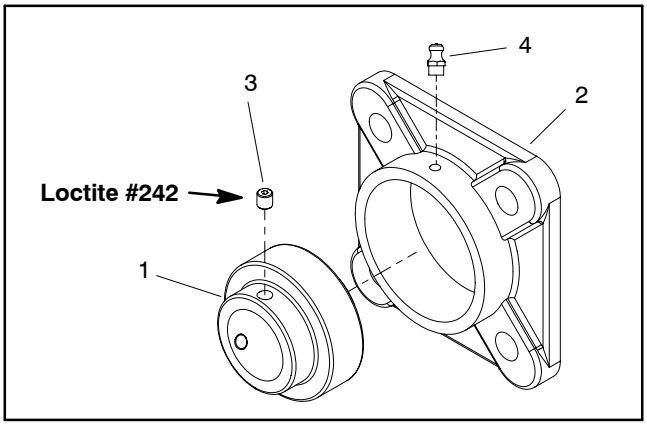


Figure 5

1. **Bearing**
2. **Bearing housing (4 bolt)**
3. **Set screw (2 used)**
4. **Grease fitting**

Roller (ProCore SR75)

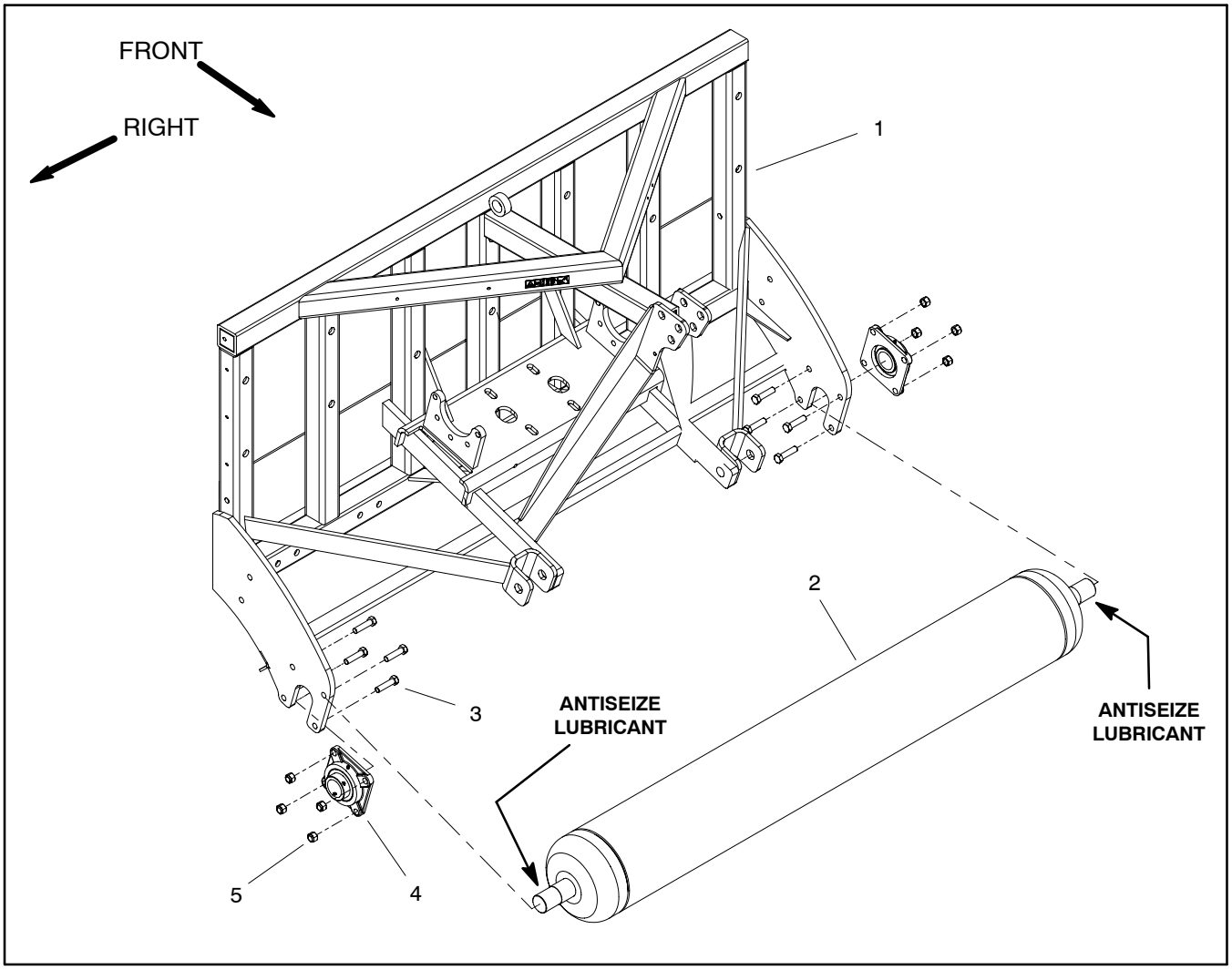


Figure 6

1. **Aerator frame**
2. **Roller**
3. **Cap screw (4 used per bearing)**
4. **Flange bearing (2 used)**
5. **Lock nut (4 used per bearing)**

Roller Removal (Fig. 6)

1. Position aerator on a firm, level surface with aerator attached to tractor. Disengage PTO, apply tractor parking brake, stop engine and remove key from the ignition switch.

2. Support aerator to prevent it from moving.

3. Chock roller to prevent it from moving.

4. Loosen two (2) set screws that secure each bearing locking collar to roller shaft (Fig. 7).

5. Remove four (4) cap screws and lock nuts that secure flange bearings (item 4) to aerator frame.

6. Start engine on tractor. Slowly raise aerator while allowing roller assembly to remain on the ground. Stop tractor engine and remove key from the ignition switch. Support raised aerator to prevent it from lowering unexpectedly.

CAUTION

To prevent personal injury, make sure that roller is supported as it is removed from the machine.

7. Remove roller with flange bearings from under machine.

8. Slide flange bearings from roller shaft ends.

Roller Installation (Fig. 6)

1. Clean roller shaft ends and apply antiseize lubricant to shaft ends. Slide flange bearing onto roller shaft ends. Do not tighten set screws in bearings at this time.

CAUTION

To prevent personal injury, make sure that roller is supported as it is installed to the machine.

2. Position roller with flange bearings under raised aerator.

NOTE: Drop speed can be adjusted on the tractor. Refer to the Tractor Operator's Manual for additional information.

3. Start engine on tractor. Slowly lower aerator to position aerator frame to roller assembly. Stop tractor engine and remove key from the ignition switch.

4. Align holes in flange bearings with holes in aerator frame. Make sure that bearing grease fittings point to front of aerator. Secure both bearings to frame with four (4) cap screws and lock nuts.

5. Check that roller is free to rotate and no binding exists. Center roller between bearings.

6. Apply Loctite #242 (or equivalent) to threads of bearing set screws. Tighten two (2) set screws to secure each bearing locking collar to roller shaft.

7. Lubricate grease fittings on bearings.

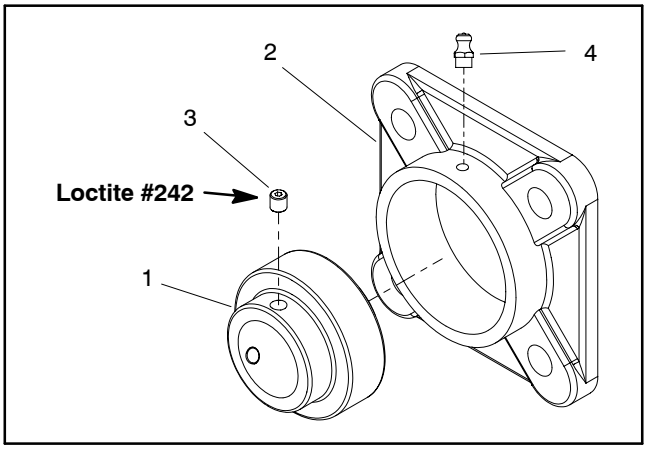


Figure 7

1. **Bearing**
2. **Bearing housing (4 bolt)**
3. **Set screw (2 used)**
4. **Grease fitting**

PTO Driveshaft

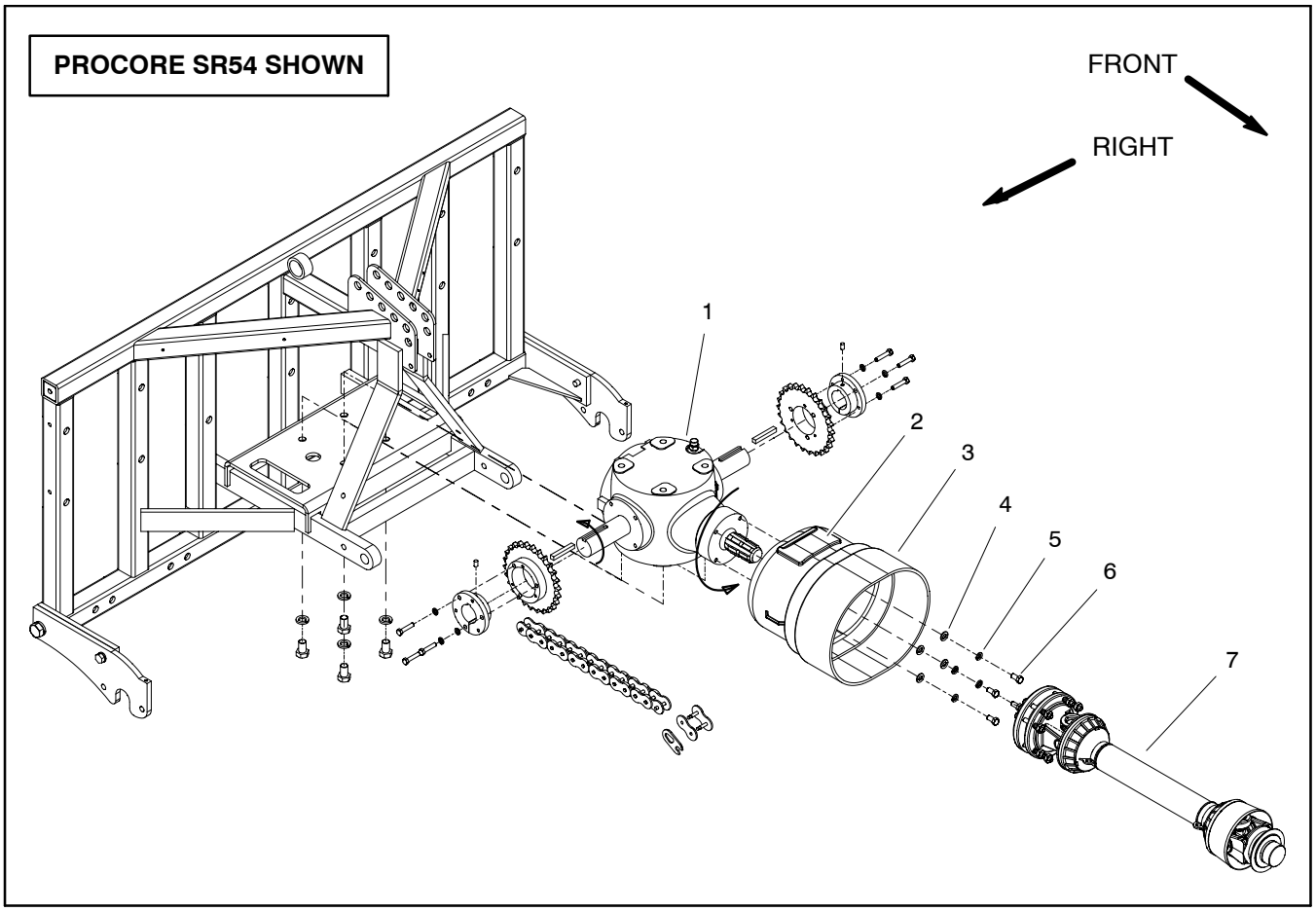


Figure 8

1. **Gearbox**
2. **Driveshaft shield access panel**
3. **PTO driveshaft shield**
4. **Flat washer (4 used)**
5. **Lock washer (4 used)**
6. **Cap screw (4 used)**
7. **PTO driveshaft**

CAUTION

The friction clutch on the PTO driveshaft may become hot during use. To prevent personal injury, make sure that clutch has cooled before performing any service on the driveshaft.

Removal (Fig. 8)

1. Position aerator on a firm, level surface. If aerator is attached to tractor, disengage PTO, apply tractor parking brake, stop engine and remove key from the ignition switch.

2. Unhook driveshaft shield safety chains from the tractor and the aerator driveshaft shield.

3. Support PTO driveshaft to prevent it from falling.

4. Separate PTO driveshaft from tractor PTO shaft (Fig. 9):

   A. Pull back on locking collar to release driveshaft from PTO shaft.

   B. Slide driveshaft yoke from PTO shaft.

5. Separate PTO driveshaft from gearbox input shaft (Fig. 10):

   A. Open driveshaft shield access panel to be able to reach PTO driveshaft coupler.

   B. Remove pin and lock nut from PTO driveshaft coupler at aerator gearbox input shaft.

   C. Slide driveshaft coupler from gearbox shaft.

6. Remove driveshaft from machine.

Installation (Fig. 8)

1. Apply grease to gearbox input shaft and tractor output shaft.

2. Position PTO driveshaft with clutch end toward aerator gearbox.

3. Secure PTO driveshaft coupler to gearbox input shaft (Fig. 10):

   A. Align splines of driveshaft coupler with gearbox input shaft and slide coupler onto shaft.

   B. Secure driveshaft coupler to gearbox input shaft with pin and nut.

   C. Close and secure driveshaft shield access panel.

4. Secure PTO driveshaft to tractor PTO shaft (Fig. 9):

   A. Align splines of driveshaft yoke with tractor PTO shaft and slide yoke onto shaft as far as possible.

   B. Pull back on yoke so that locking collar secures driveshaft to PTO shaft.

   C. Check that driveshaft yoke is properly locked by sliding yoke on PTO shaft.

5. Lubricate driveshaft grease fittings.

6. Connect driveshaft shield safety chains to the tractor and the aerator driveshaft shield. Make sure that chains remain slack when the aerator is raised or lowered.

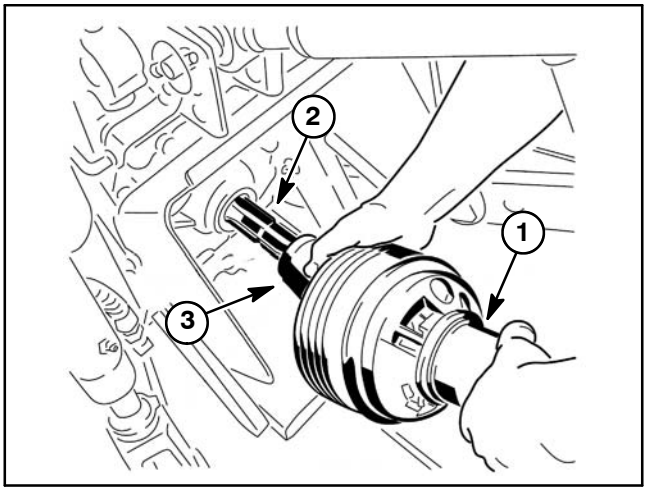
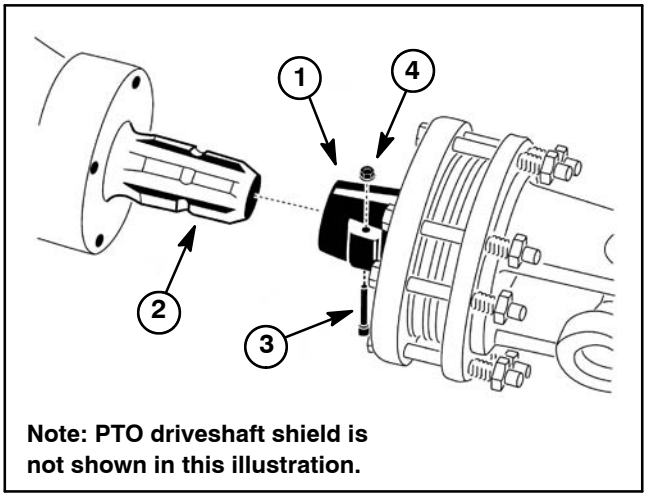


Figure 9

1. **Driveshaft**
2. **Tractor PTO shaft**
3. **Locking collar**



Note: PTO driveshaft shield is not shown in this illustration.

Figure 10

1. **Driveshaft coupler**
2. **Gearbox input shaft**
3. **Pin**
4. **Nut**

PTO Driveshaft Clutch Service

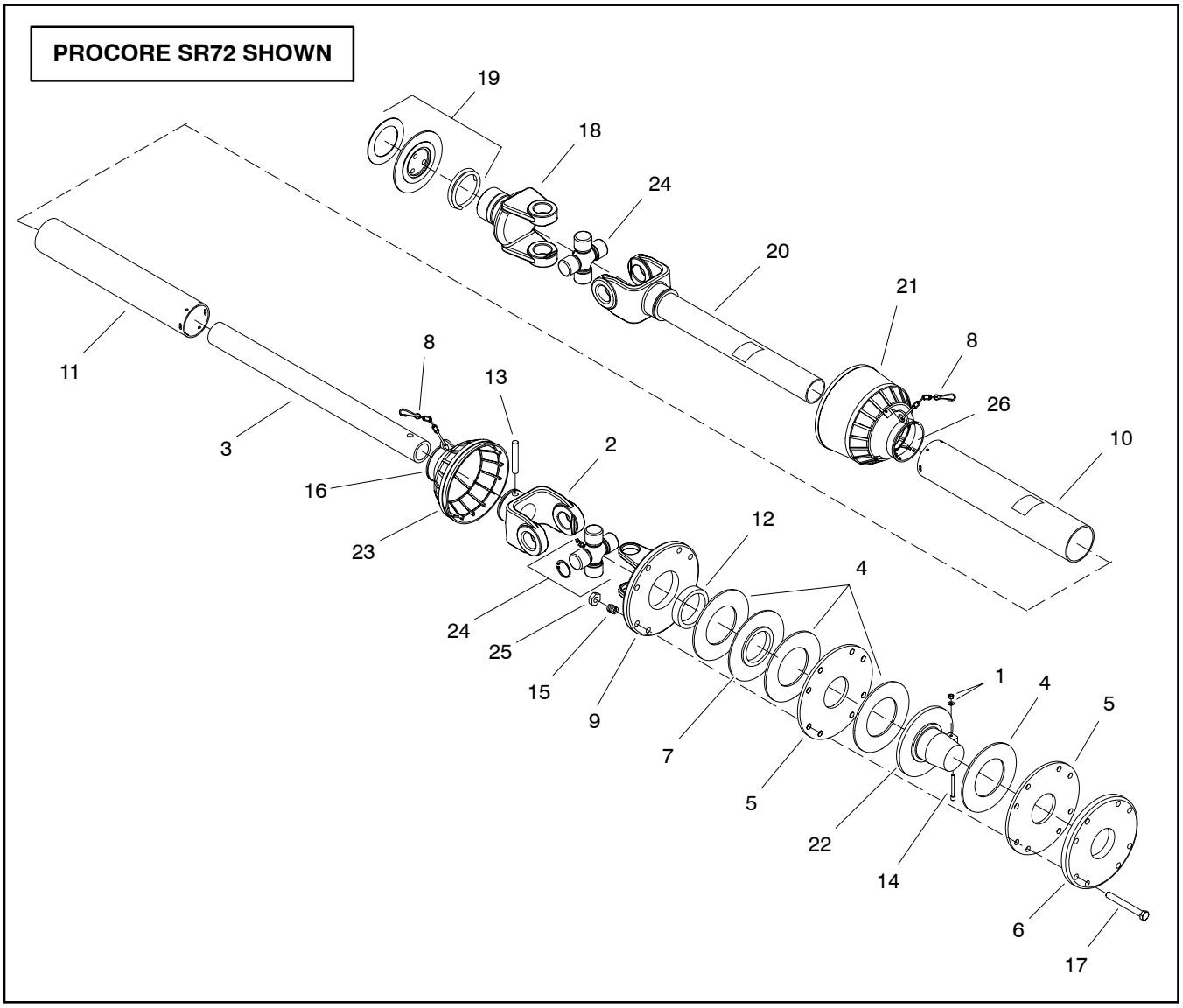


Figure 11

1. Lock nut
2. Inner tube yoke
3. Inner tube
4. PTO clutch lining
5. Pressure plate
6. PTO pressure plate
7. Driving plate
8. Safety chain
9. Flange yoke
10. Outer tube cover
11. Inner tube cover
12. Bushing
13. Roll pin
14. Screw
15. Spring (8 used)
16. Connector
17. Cap screw (8 used)
18. Yoke
19. Ball and collar kit
20. Yoke with tube
21. Cone shield (tractor side)
22. Splined hub
23. Cone shield (clutch side)
24. Cross and bearing kit
25. Nut (8 used)
26. Connector

CAUTION

The friction clutch on the PTO driveshaft may become hot during use. To prevent personal injury, make sure that clutch has cooled before performing any service on the driveshaft.

NOTE: The PTO driveshaft used on SR48, SR54, SR54–S, SR70 and SR70–S aerators include two (2) clutch linings and fewer driveshaft components on the aerator end of the PTO driveshaft (Fig. 12). Driveshaft clutch service for all ProCore SR models is similar.

Clutch Disassembly (Fig. 11)

1. Position aerator on a firm, level surface. If aerator is attached to tractor, disengage PTO, apply tractor parking brake, stop engine and remove key from the ignition switch.

2. Remove PTO driveshaft from aerator (see PTO Driveshaft Removal in this section).

3. Remove eight (8) cap screws (item 17), nuts (item 25) and springs (item 15) that secure clutch assembly to driveshaft flange yoke.

4. Remove clutch components from driveshaft using Figure 11 as a guide.

Clutch Assembly (Fig. 11)

1. Assemble clutch components to driveshaft using Figure 11 as a guide.

2. Secure clutch components with eight (8) cap screws (item 17), springs (item 15) and nuts (item 25). Tighten nuts so that spring length is 1.125" (28.6 mm) (Fig. 13).

3. Install PTO driveshaft to aerator (see PTO Driveshaft Installation in this section).

IMPORTANT: DO NOT overtighten nuts that tension clutch springs on PTO driveshaft. Driveshaft clutch is designed to slip if drive system is over-loaded. If nuts are overtightened, driveshaft or tractor transmission damage may occur.

4. After installation is complete, check that clutch does not slip. If clutch is slipping, tighten nuts equally in 1/4 turn increments until clutch slippage ceases.

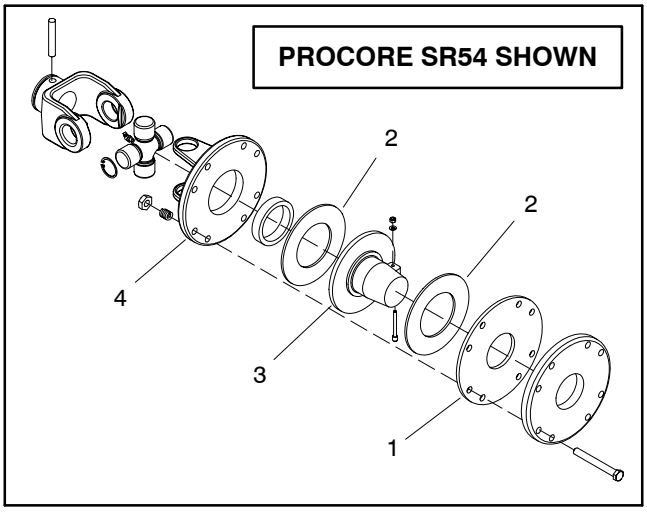


Figure 12

1. PTO pressure plate
2. PTO clutch lining
3. PTO flange hub
4. Flange yoke

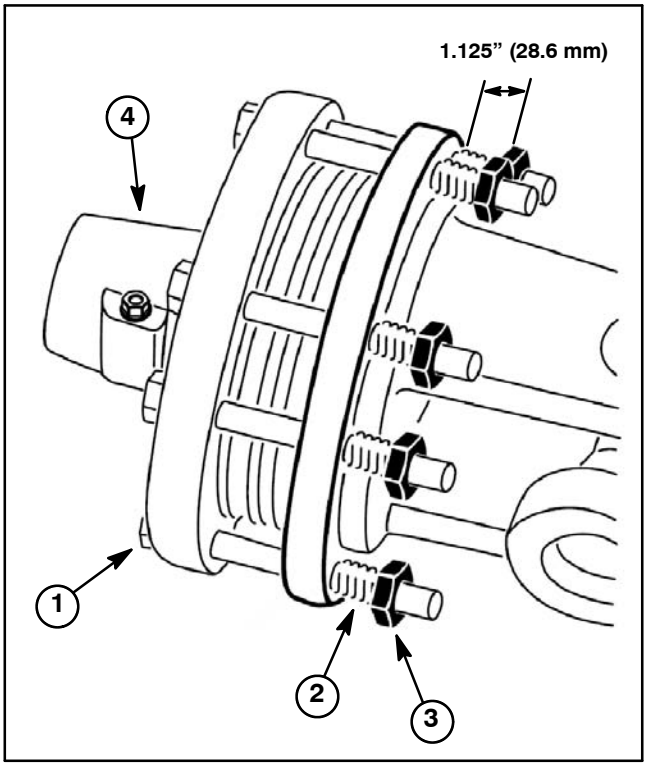


Figure 13

1. Cap screw
2. Spring
3. Nut
4. Flange yoke

PTO Driveshaft Cross and Bearing Service

1. Remove PTO driveshaft from aerator (see PTO Driveshaft Removal in this section).

2. If necessary, separate PTO driveshaft and remove shields.

IMPORTANT: When placing yoke in vise, clamp lightly on the solid part of the yoke to prevent yoke damage. Also, the use of a vise with soft jaws is recommended.

3. Lightly clamp yoke in vise with soft jaws. Remove snap rings that secure bearings in each yoke. Remove yoke from vise.

IMPORTANT: To prevent damage to driveshaft yokes, support yokes when removing and installing bearings.

4. Use a press to remove cross and bearings from yokes:

   A. Place a small socket against one bearing and a large socket against the yoke on the opposite side.

   B. While supporting the large socket, apply pressure on small socket to partially push the opposite bearing into the large socket.

   C. Remove yoke from press, grasp partially removed bearing and tap on yoke to completely remove the bearing.

   D. Repeat process for remaining bearings.

   E. Thoroughly clean and inspect all components.

5. To install new cross and bearings:

   A. Apply a coating of grease to bearing bores of end yoke and shaft yoke. Also, apply grease to bearings and seal of bearing assembly. Make sure that all bearing rollers are properly seated in bearing cage.

   B. Press one bearing partially into yoke.

   IMPORTANT: Take care when installing cross into bearing to avoid damaging bearing seal.

   C. Carefully insert cross into bearing and yoke.

   D. Hold cross in alignment and press bearing in until it hits the yoke.

   E. Carefully place second bearing into yoke bore and onto cross shaft. Press bearing into yoke.

   F. Install snap rings to secure bearings in place.

   G. Repeat procedure for other yoke.

   H. Grease cross until grease comes out of all four (4) bearing cups.

6. Make sure that assembled joint moves without binding. Slight binding can usually be eliminated by lightly rapping the yoke lugs with a soft faced hammer. If binding continues, disassemble joint to identify source of binding.

7. If driveshaft was separated for cross and bearing service, install shields and assemble driveshaft halves.

8. Install PTO driveshaft to aerator (see PTO Driveshaft Installation in this section).

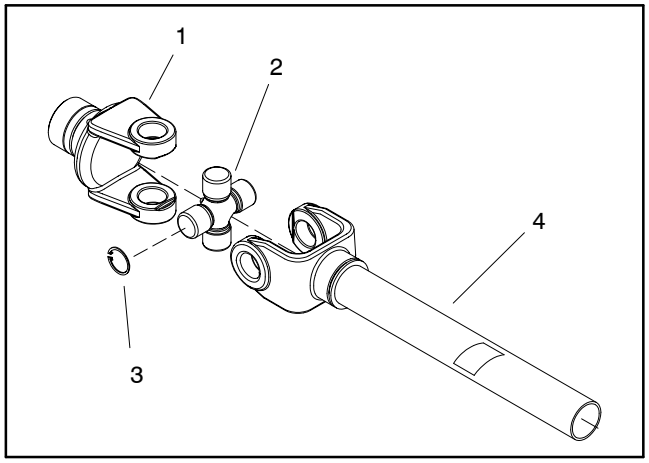


Figure 14

1. **End yoke**
2. **Cross and bearing kit**
3. **Snap ring (4 used)**
4. **Shaft yoke**

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Hydraulic Top Link

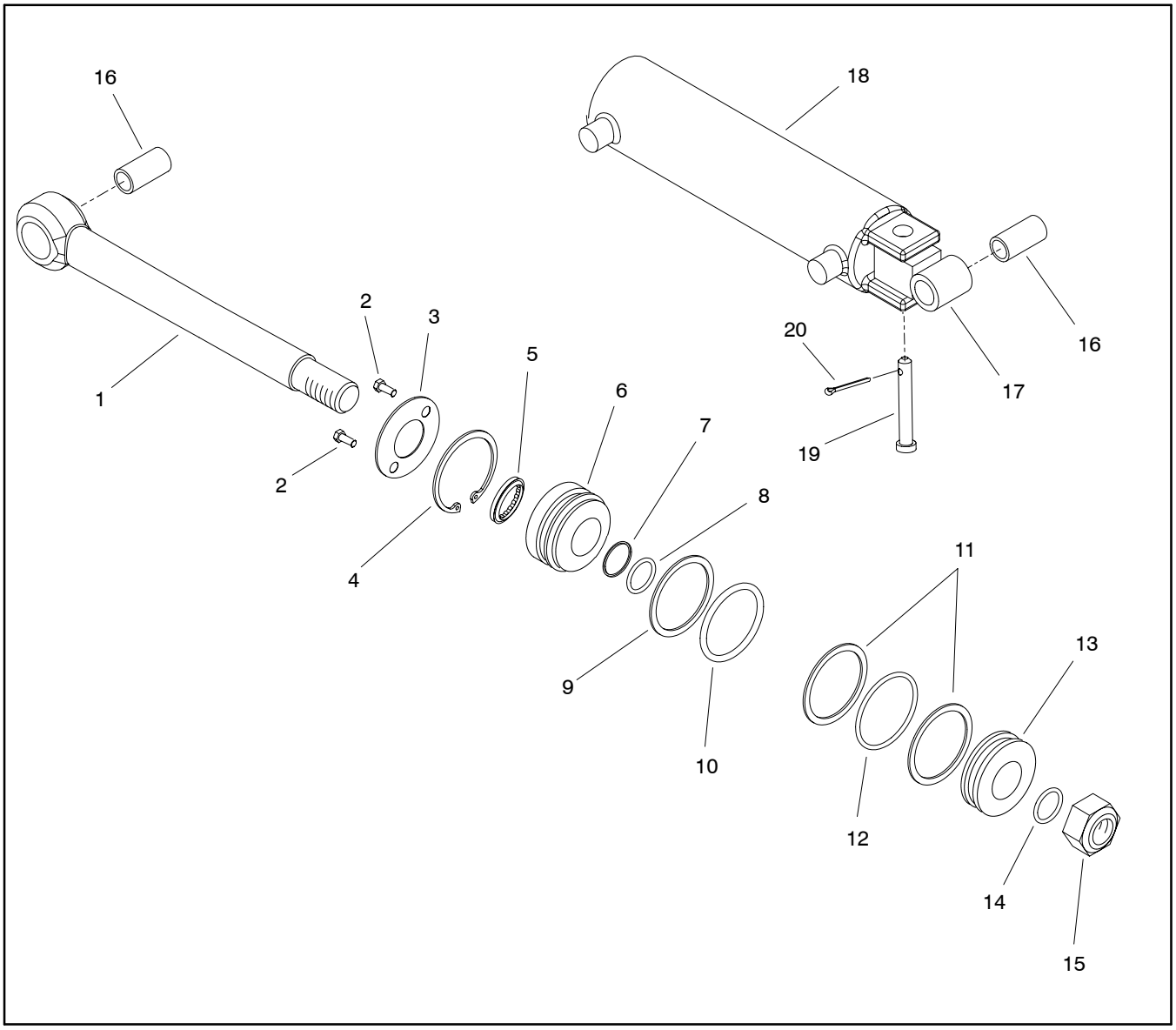

Figure 15

1. **Shaft**
2. **Cap screw (2 used)**
3. **Retainer plate**
4. **Retaining ring**
5. **Wiper**
6. **Head**
7. **Back-up ring**
8. **O-ring**
9. **Back-up ring**
10. **O-ring**
11. **Back-up ring**
12. **O-ring**
13. **Piston**
14. **O-ring**
15. **Lock nut**
16. **Spacer**
17. **Adapter**
18. **Barrel**
19. **Pin**
20. **Cotter pin**

Disassembly (Fig. 15)

1. Remove hydraulic top link from aerator and tractor (Fig. 16).

2. Remove spacers (item 16) from cylinder shaft clevis and adapter on barrel end.

3. Remove oil from hydraulic cylinder into a drain pan by slowly pumping the cylinder shaft. Plug both cylinder ports and clean the outside of the cylinder.

4. Remove two (2) cap screws that secure retainer plate to head. Position plate away from cylinder barrel to allow access to retaining ring (item 4).

5. Remove retaining ring from groove in barrel.

6. Extract shaft, head and piston assembly by carefully twisting and pulling on the shaft.

IMPORTANT: Do not clamp vise jaws against the shaft surface. Clamp on the shaft clevis ONLY.

7. Mount shaft securely in a vise by clamping on the clevis of the shaft. Remove lock nut and piston from the shaft. Carefully slide head and retainer plate off the shaft.

8. Taking care to not scratch or damage components, remove and discard wiper, back-up rings and O-rings from head and piston.

Inspection

CAUTION

Use eye protection such as goggles when using compressed air to dry cylinder components.

1. Wash all cylinder components in clean solvent. Dry parts with compressed air.

2. Inspect internal surface of barrel for deep scratches, out-of-roundness and bending. Replace if worn or damaged.

3. Inspect head, shaft and piston for excessive pitting, scoring and wear. Replace any worn or damaged parts.

Assembly (Fig. 15)

1. Make sure all hydraulic cylinder parts are clean before assembly.

2. Coat new O-rings, back-up rings and wiper with clean hydraulic oil. Carefully install new back-up rings, O-rings and wiper to head and piston.

IMPORTANT: Do not clamp vise jaws against the shaft surface. Clamp on the shaft clevis ONLY.

3. Mount shaft securely in a vise by clamping on the clevis of the shaft.

A. Coat shaft with clean hydraulic oil.

B. Slide retainer plate and then head onto the shaft. Make sure that threaded holes in head are toward the retainer plate location.

C. Install piston onto the shaft and secure with lock nut.

D. Remove shaft assembly from the vise.

4. Coat all internal parts with a light coat of clean hydraulic oil. Slide shaft, head and piston assembly into the barrel being careful not to damage the seals.

5. Secure head in barrel with retaining ring. Make sure that retaining ring is fully seated in groove in barrel.

6. Pull shaft so that head is at top of barrel. Position retainer plate to barrel and head. Secure retainer plate with two (2) cap screws.

7. Slide spacers (item 16) into cylinder shaft clevis and adapter on barrel end.

8. Install hydraulic top link to aerator and tractor (Fig. 16).

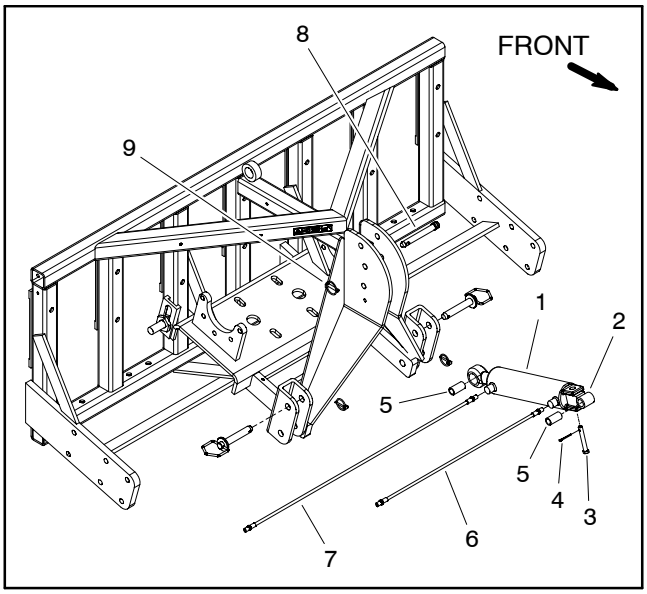

Figure 16

1. **Hydraulic top link**
2. **Adapter**
3. **Pin**
4. **Cotter pin**
5. **Spacer**
6. **Hydraulic hose**
7. **Hydraulic hose**
8. **Link**
9. **Lynch pin**

Covers (ProCore SR54, SR54-S, SR70 and SR70-S)

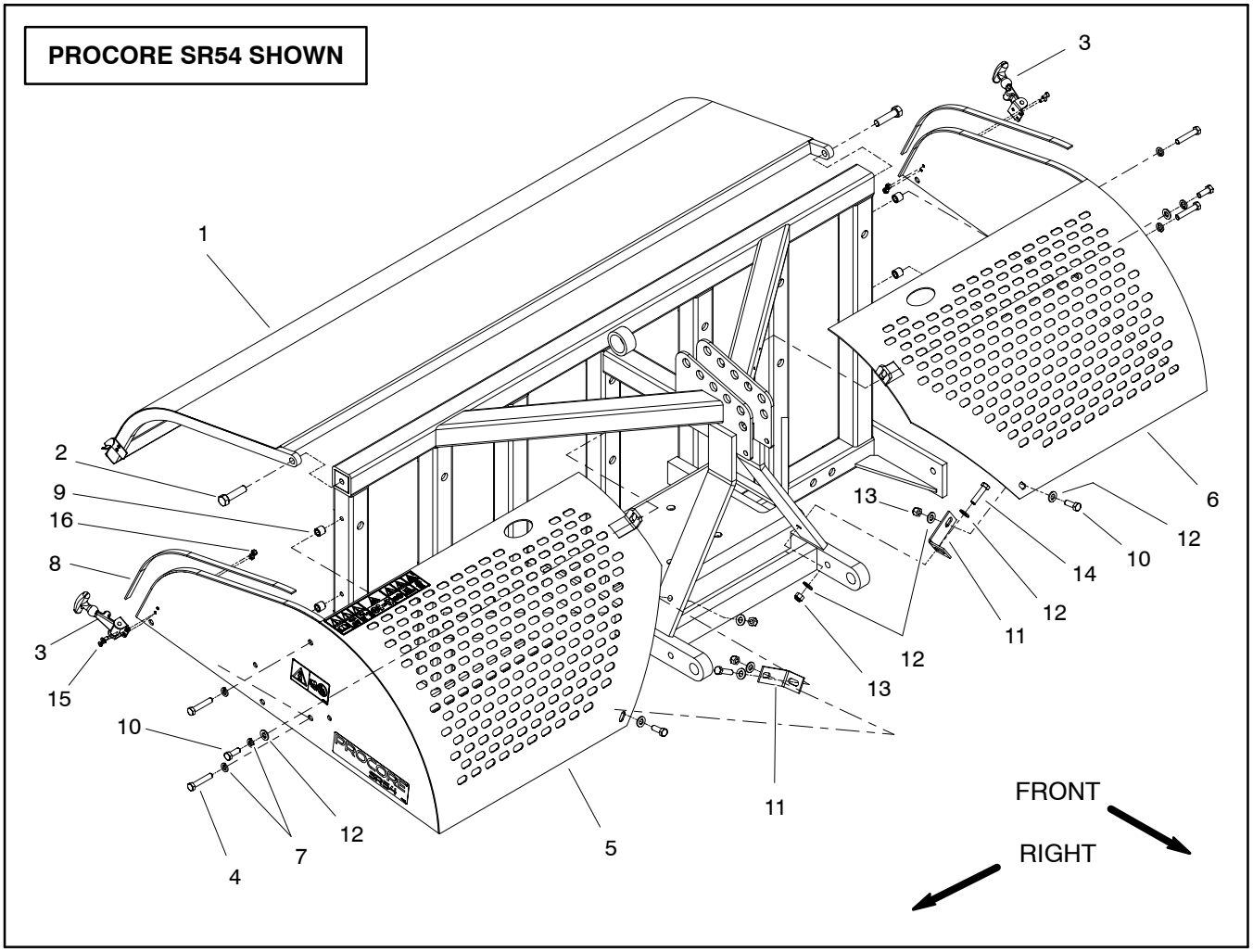

Figure 17

1. **Rear hood**
2. **Cap screw (2 used)**
3. **Latch (2 used)**
4. **Cap screw (4 used)**
5. **RH screen**
6. **LH screen**
7. **Lock washer (6 used)**
8. **Foam strip (2 used)**
9. **Spacer (2 used per screen)**
10. **Cap screw (4 used)**
11. **Screen clip (2 used)**
12. **Flat washer (10 used)**
13. **Lock nut (4 used)**
14. **Cap screw (2 used)**
15. **Socket head screw (4 used)**
16. **Lock nut (4 used)**

NOTE: The covers used on the ProCore SR54, SR54-S, SR70 and SR70-S are very similar. The procedure for removal and installation of the covers is the same on these models. The ProCore SR54 is shown in Figure 17.

Removal (Fig. 17)

1. Position aerator on a firm, level surface. If aerator is attached to tractor, disengage PTO, apply tractor parking brake, stop engine and remove key from the ignition switch.

2. If necessary, remove rear hood:

   A. Unlatch rear hood.

   B. Remove two (2) cap screws (item 2) that secure rear hood to frame.

   C. Remove rear hood from machine.

3. To remove front screen (item 5 or 6):

   A. Unlatch, raise and support rear hood if it is attached to frame.

   B. Support front screen to prevent it from falling.

   C. Remove cap screw, lock nut and two (2) flat washers that secure front screen to screen clip (item 11).

   D. Remove cap screw, lock washer and flat washer that secure front screen to frame.

   E. Remove two (2) cap screws and flat washers that secure front screen to frame. Retrieve two (2) spacers (item 9) from between screen and frame.

   F. Remove front screen from machine.

Installation (Fig. 17)

1. Make sure that screen clip (item 11) is loosely attached to frame.

2. To install front screen (item 5 or 6):

   A. Position front screen to machine.

   B. Place two (2) spacers (item 9) between screen and frame. Install two (2) cap screws and lock washers to secure front screen to frame.

   C. Secure front screen to screen clip (item 11) with cap screw, lock nut and two (2) flat washers.

   D. Secure front screen tab to frame with cap screw, lock washer and flat washer.

3. If removed, secure rear hood to machine with two (2) cap screws (item 2).

4. Lower and secure rear hood.

Covers (ProCore SR48 and SR72)

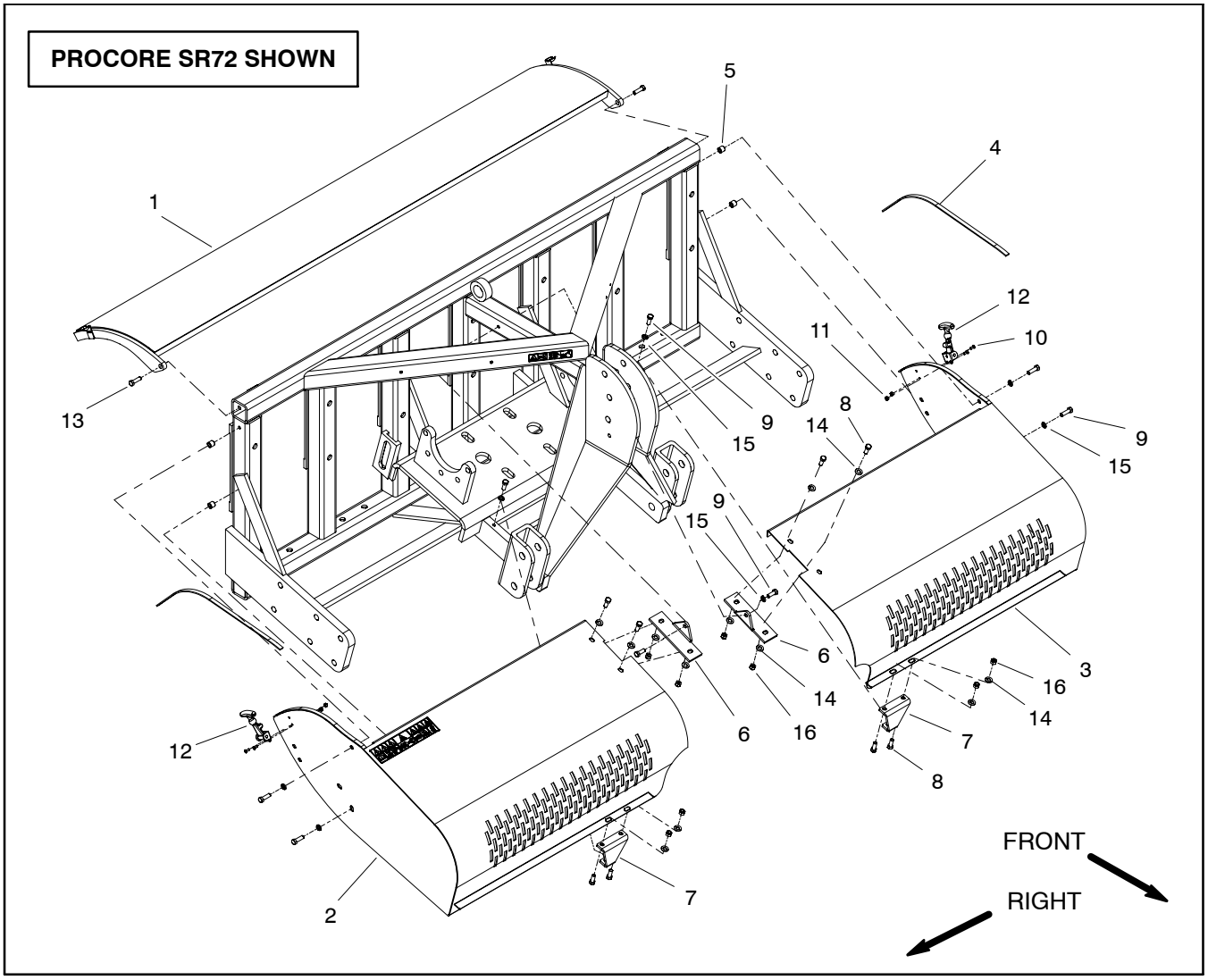

Figure 18

1. **Rear hood**
2. **RH screen**
3. **LH screen**
4. **Foam strip (2 used)**
5. **Spacer (4 used)**
6. **Top screen clip (2 used)**
7. **Front screen bracket (2 used)**
8. **Cap screw (8 used)**
9. **Cap screw (8 used)**
10. **Socket head screw (4 used)**
11. **Lock nut (4 used)**
12. **Latch assembly (2 used)**
13. **Cap screw (2 used)**
14. **Flat washer (12 used)**
15. **Lock washer (8 used)**
16. **Lock nut (8 used)**

NOTE: The covers used on the ProCore SR48 and SR72 are very similar. The procedure for removal and installation of the covers is the same on these models. The ProCore SR72 is shown in Figure 18.

Removal (Fig. 18)

1. Position aerator on a firm, level surface. If aerator is attached to tractor, disengage PTO, apply tractor parking brake, stop engine and remove key from the ignition switch.

2. If necessary, remove rear hood:

   A. Unlatch rear hood.

   B. Remove two (2) cap screws (item 13) that secure rear hood to frame.

   C. Remove rear hood from machine.

3. To remove front screen (item 2 or 3):

   A. Unlatch, raise and support rear hood if it is attached to frame.

   B. Support front screen to prevent it from falling.

   C. Remove cap screws and lock washers that secure top screen clip (item 6) and front screen bracket (item 7) to frame.

   D. Remove two (2) cap screws and lock washers that secure front screen to frame channels. Retrieve two (2) spacers (item 5) from between screen and frame.

   E. Remove front screen from machine.

4. If necessary, remove top screen clip (item 6) and front screen bracket (item 7) from front screen.

Installation (Fig. 18)

1. If removed, secure top screen clip (item 6) and front screen bracket (item 7) to front screen.

2. To install front screen (item 2 or 3):

   A. Position front screen to machine.

   B. Place two (2) spacers (item 5) between screen and frame. Install two (2) cap screws and lock washers to secure front screen to frame channels.

   C. Secure top screen clip (item 6) and front screen bracket (item 7) to frame with cap screws and lock washers.

3. If removed, secure rear hood to machine with two (2) cap screws (item 13).

4. Lower and secure rear hood.

Covers (ProCore SR75)

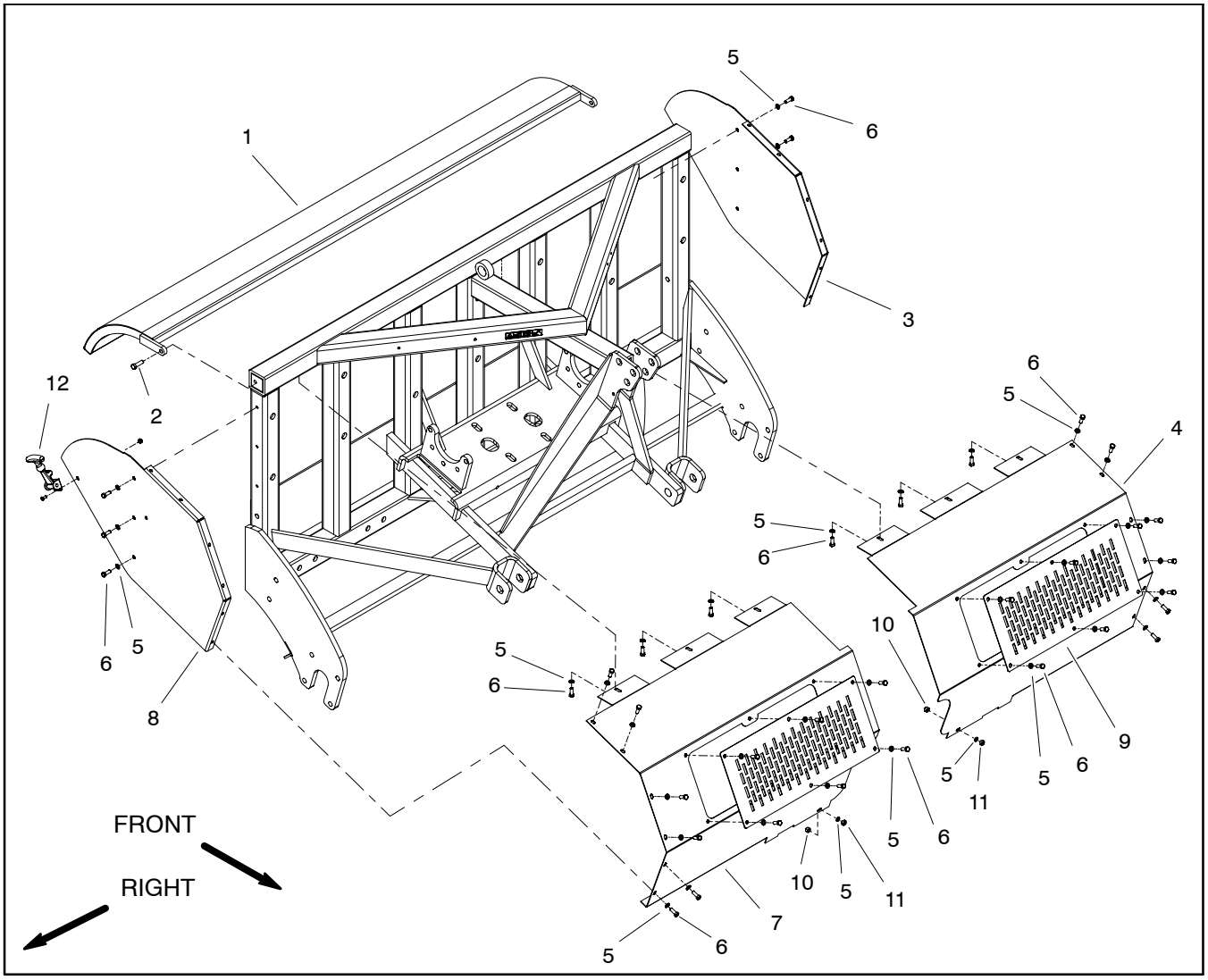

Figure 19

1. **Rear hood**
2. **Cap screw (2 used)**
3. **LH end cover**
4. **LH front screen**
5. **Lock washer (38 used)**
6. **Cap screw (36 used)**
7. **RH front screen**
8. **RH end cover**
9. **Window plate (2 used)**
10. **Spacer (2 used)**
11. **Hex nut (2 used)**
12. **Latch assembly (2 used)**

Removal (Fig. 19)

1. Position aerator on a firm, level surface. If aerator is attached to tractor, disengage PTO, apply tractor parking brake, stop engine and remove key from the ignition switch.

2. Remove rear hood and front screens using Figure 19 as a guide.

Installation (Fig. 19)

1. Install rear hood and front screens using Figure 19 as a guide.

Chapter 4

Coring Head (SR54 & SR70)

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Specifications

Item	Description
ProCore SR54	
Aerating Width	54 inches (1.37 meters)
Number of Connecting Rods	6
Number of Rollers	1
Depth Adjustment	Hydraulic Top Link
Gearbox Lubricant	SAE 80W-90 gear lube
Gearbox Lubricant Capacity	2 US quart (1.9 liter)
Gearbox Weight (approximate)	80 lbs (36 kg)
ProCore SR54-S	
Aerating Width	54 inches (1.37 meters)
Number of Connecting Rods	6
Number of Rollers	2
Depth Adjustment	Fixed Top Link
Gearbox Lubricant	SAE 80W-90 gear lube
Gearbox Lubricant Capacity	2 US quart (1.9 liter)
Gearbox Weight (approximate)	80 lbs (36 kg)
ProCore SR70	
Aerating Width	73 inches (1.85 meters)
Number of Connecting Rods	8
Number of Rollers	1
Depth Adjustment	Hydraulic Top Link
Gearbox Lubricant	SAE 80W-90 gear lube
Gearbox Lubricant Capacity	2 US quart (1.9 liter)
Gearbox Weight (approximate)	109 lbs (50 kg)
ProCore SR70-S	
Aerating Width	73 inches (1.85 meters)
Number of Connecting Rods	8
Number of Rollers	2
Depth Adjustment	Fixed Top Link
Gearbox Lubricant	SAE 80W-90 gear lube
Gearbox Lubricant Capacity	2 US quart (1.9 liter)
Gearbox Weight (approximate)	109 lbs (50 kg)

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Coring Head

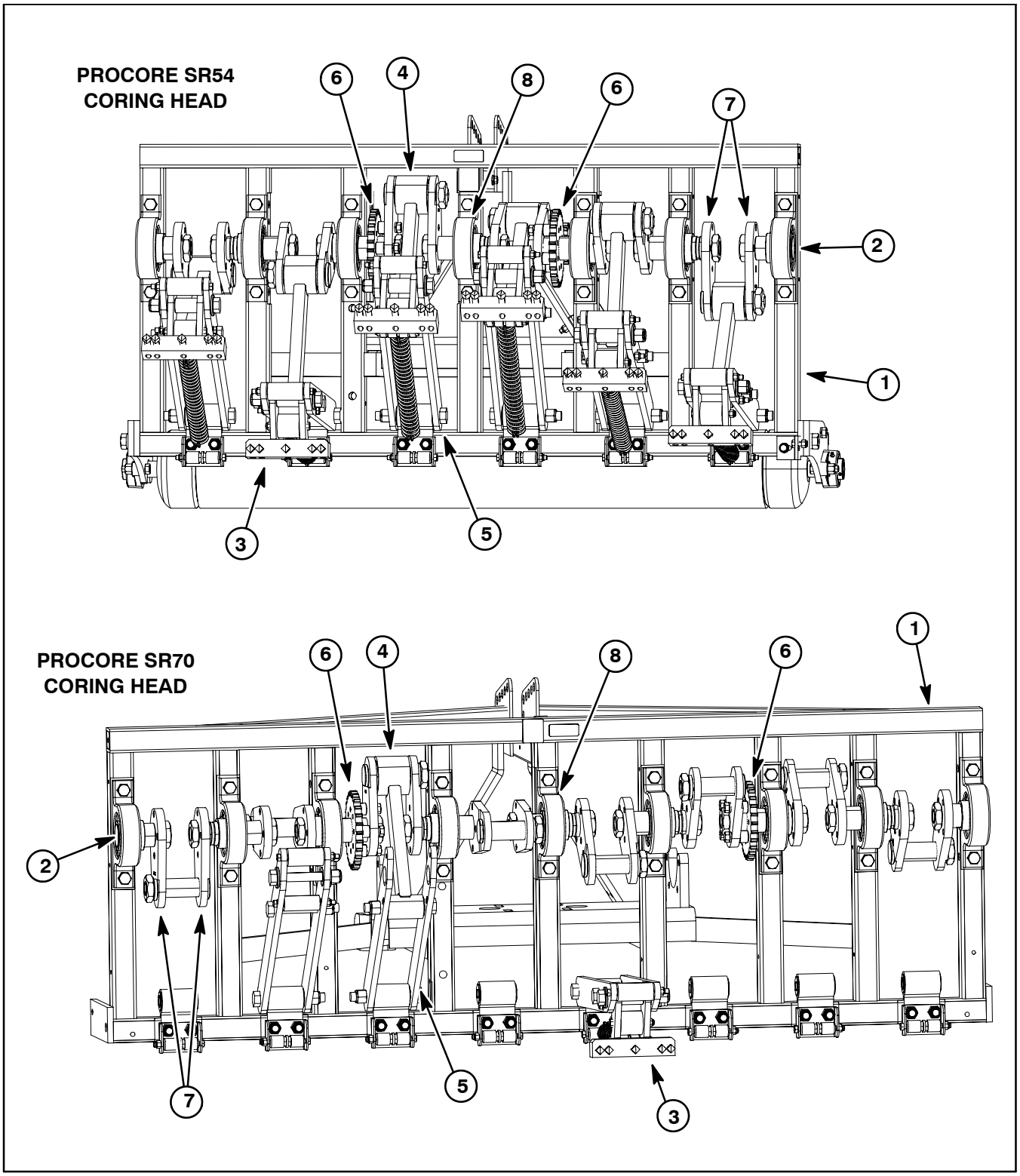

Figure 1

1. Aerator frame
2. Coring crankshaft assembly
3. Tine holder
4. Connecting rod
5. Linkage arm assembly
6. Drive chain sprocket
7. Crank arm
8. Bearing holder

The coring head of a ProCore SR deep tine aerator consists of the aerator frame, a coring crankshaft assembly, tine holders and aerating tines. The rotating crankshaft assembly operates a number of connecting rods with linkage arm assemblies to provide effective tine motion for deep turf aeration. The SR54 and SR70 aerator frames pivot on a single roller to allow aerating depth control. The SR54-S and SR70-S aerators are equipped with dual rollers.

Drive for the coring head is provided by the towing tractor PTO output shaft. A gearbox on the ProCore aerator is rotated by a driveshaft connected to the tractor PTO shaft. The aerator gearbox provides rotation for the coring head crankshaft assembly with two (2) drive chains. The drive chains are each tensioned by an adjustable idler sprocket.

The coring crankshaft is composed of multiple crank arms, bearings, bearing housings and crank shafts. The crankshaft assembly is designed and assembled to ensure minimal vibration during aerator operation.

A variety of tines and tine heads are available for use on ProCore SR Series aerators. Refer to the Operator's Manual for available options.

Coring Head Adjustments

See Operator's Manual for adjustment procedures for the coring head on your ProCore SR series aerator.

CAUTION

Never work on the aerator with the tow tractor PTO engaged or engine running. Always disengage the PTO, stop tractor engine, remove key from the ignition switch and wait for all machine movement to stop before performing any service to aerator components.

Special Tools

Order special tools from your Toro Distributor.

Crankshaft Nut Wrench

Use to remove and install the hex nuts that secure coring head crankshaft crank arms and connecting rods.

Toro Part Number: **SG885300**

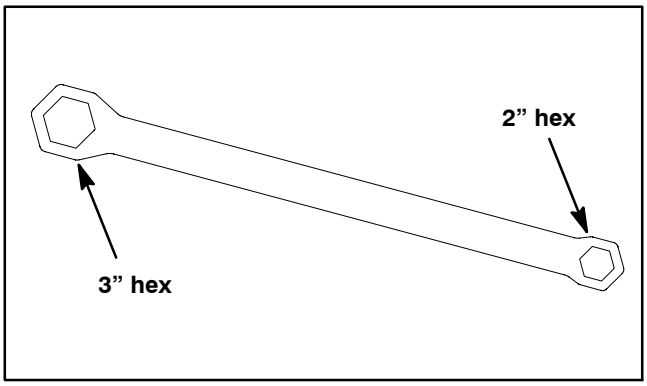

Figure 2

Bullet Tools

Use to protect threads of crankshaft components during assembly of crankshaft, connecting rods and linkage arms. The bullet tool should be installed onto the threads of the crankpin or linkage arm fastener to prevent thread damage when component is installed.

NOTE: On ProCore SR54 and SR70 aerators, bullet tool SG255001 is used for the crank pin and crank shaft. Tool SG255002 is used for the cap screws that secure the linkage arms.

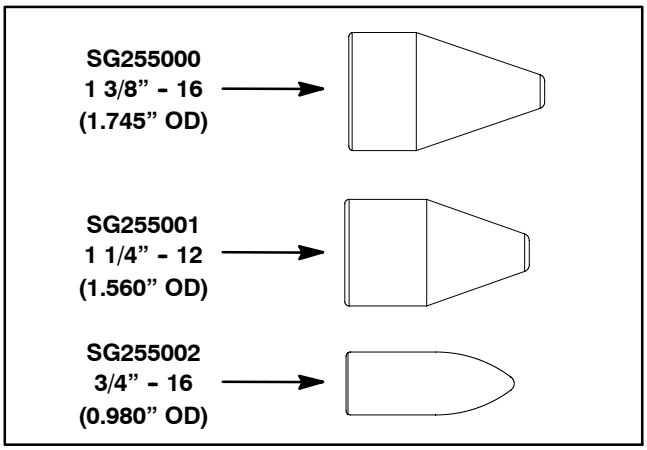

Figure 3

Torque Multiplier

Use in conjunction with an appropriate torque wrench to install and properly torque the fasteners that secure coring head crankshaft crank arms and connecting rods. Obtain this tool locally.

Figure 4

Linkage Arm Assemblies

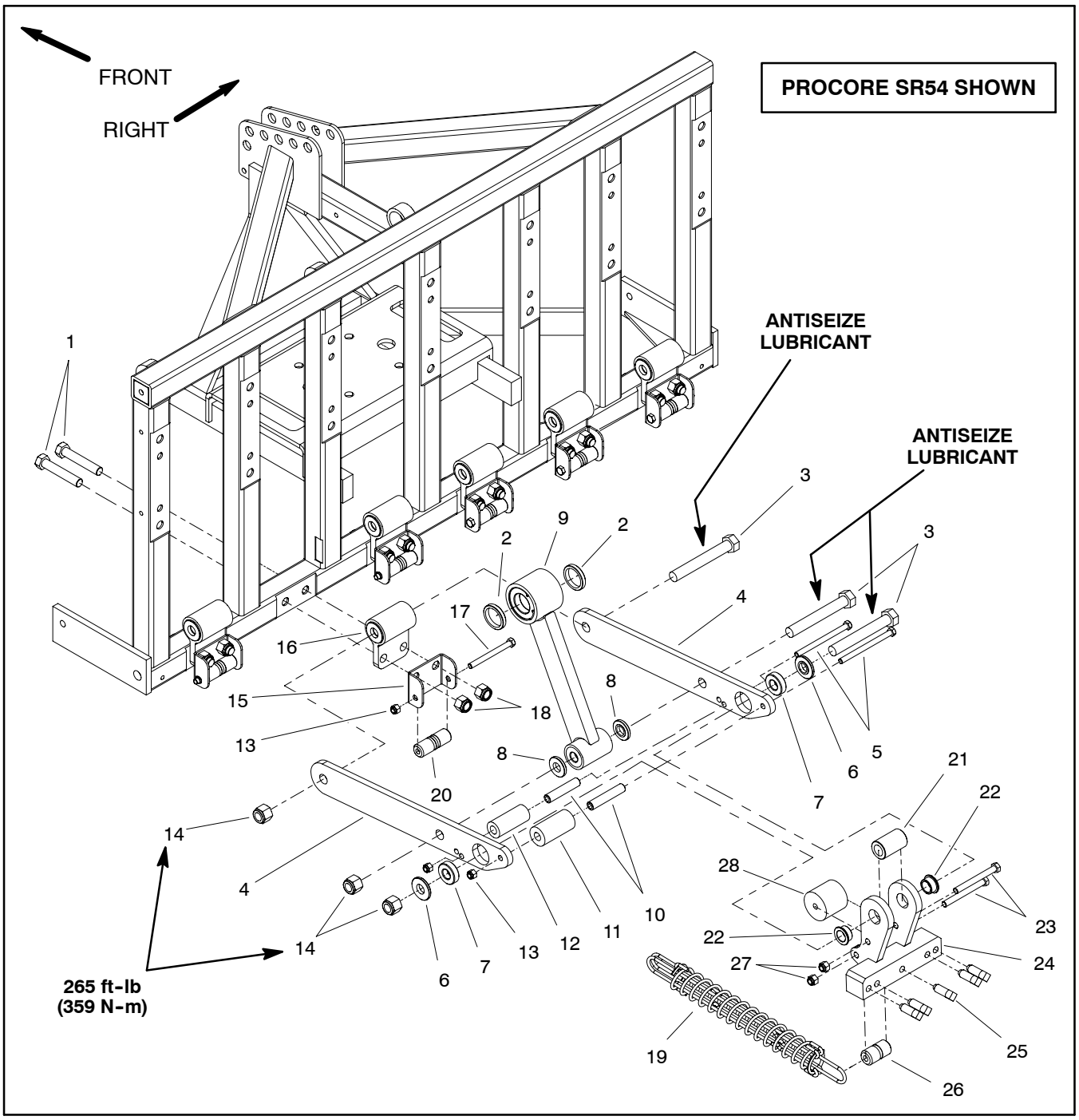

Figure 5

1. Cap screw
2. Outer bushing
3. Cap screw
4. Linkage arm
5. Cap screw
6. Outer bushing
7. Ball bearing
8. Outer bushing
9. Connecting rod
10. Linkage spacer
11. Rubber bumper
12. Rubber bumper
13. Lock nut
14. Lock nut
15. Rear spring bracket
16. Rear spool assembly
17. Cap screw
18. Lock nut
19. Spring assembly
20. Rear spring spool
21. Head spacer
22. Flange bushing
23. Cap screw
24. Tine head
25. Set screw
26. Head spool
27. Lock nut
28. Head bumper

NOTE: The linkage arm assemblies for ProCore SR54 and SR70 aerators are very similar. The ProCore SR54 linkage arm assembly is shown in Figure 5. The tine head assembly used on ProCore SR54-S and SR70-S is shown in Figure 6.

Disassembly (Fig. 5)

1. Position aerator on a firm, level surface. If aerator is attached to tractor, disengage PTO, apply tractor parking brake, stop engine and remove key from the ignition switch.

2. Remove linkage arm components as needed using Figures 5 and 6 as guides.

3. If necessary, disassemble rear spool assembly using Figure 7 as a guide.

4. Discard all removed bearings.

Assembly (Fig. 5)

1. If rear spool assembly was disassembled (Fig. 7):

   A. Make sure that retaining rings are fully seated into grooves in hinge housing.

   B. Press a new bearing into one side of the hinge housing until contacts installed retaining ring. Then press second new bearing into housing so that it contacts first bearing.

   C. Insert inner bushing into housing.

   D. Press final two (2) new bearings into housing following above procedure.

2. If bearings (item 7) were removed from linkage arms, press new bearings into arms.

NOTE: When installing cap screw (item 2), use bullet tool SG255002 (see Special Tools in this chapter) to prevent thread damage to screw.

3. Assemble all linkage arm components using Figures 5 and 6 as guides.

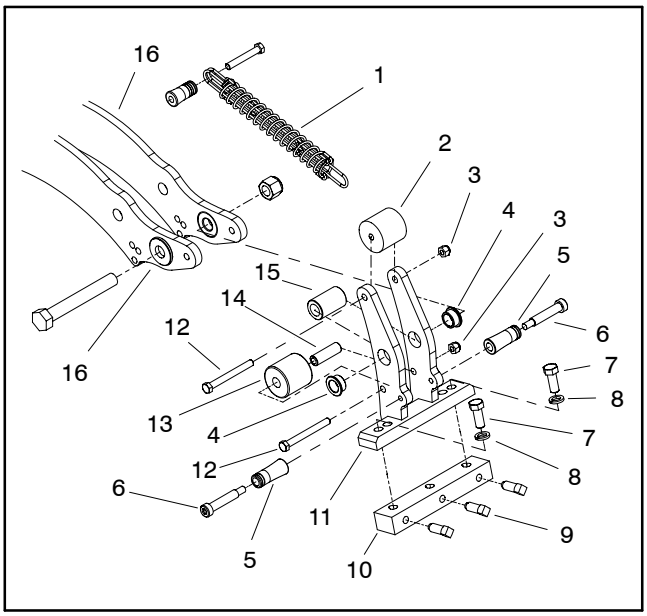

Figure 6

1. **Spring assembly**
2. **Head bumper**
3. **Lock nut**
4. **Flange bushing**
5. **Spring spool**
6. **Bolt**
7. **Cap screw**
8. **Lock washer**
9. **Set screw**
10. **Head adapter**
11. **Head spacer**
12. **Cap screw**
13. **Head bumper**
14. **Tube**
15. **Head spacer**
16. **Linkage arm**

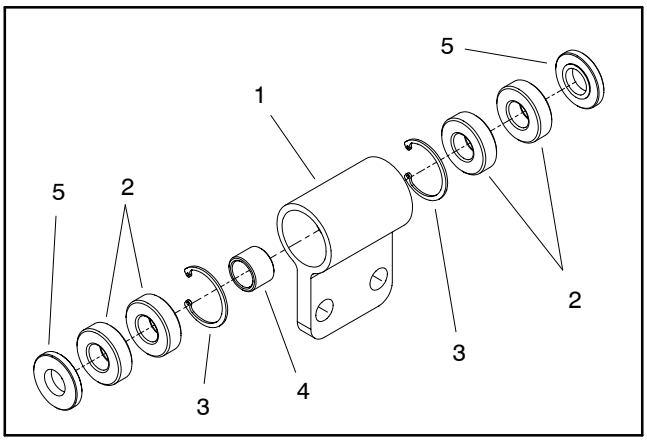

Figure 7

1. **Hinge housing**
2. **Bearing**
3. **Retaining ring**
4. **Inner bushing**
5. **Outer bushing**

Connecting Rods

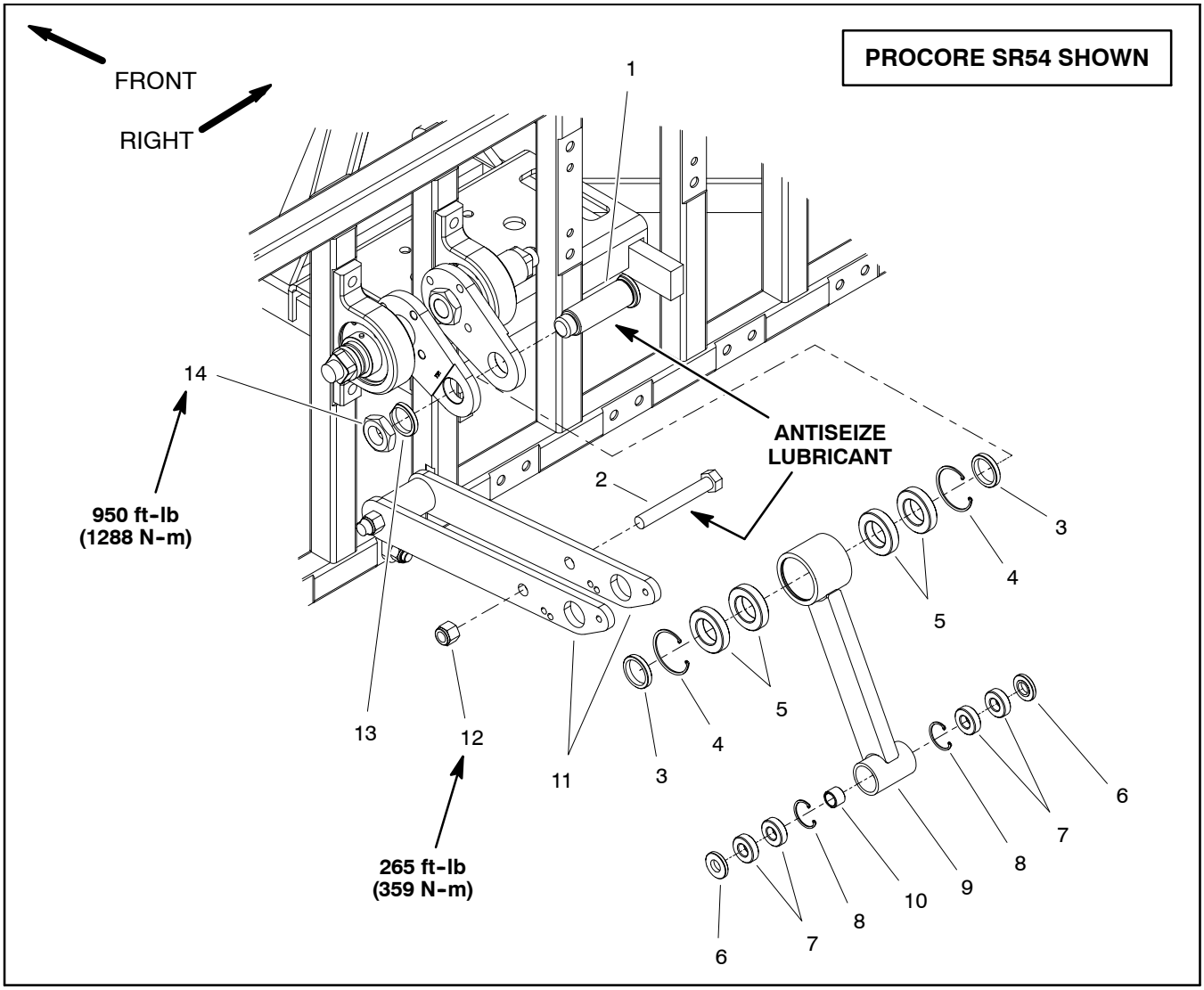

Figure 8

1. Crank pin
2. Cap screw
3. Outer bushing
4. Retaining ring
5. Ball bearing
6. Outer bushing
7. Ball bearing
8. Retaining ring
9. Connecting rod
10. Bearing spacer
11. Linkage arm
12. Lock nut
13. Clipped washer
14. Hex nut

IMPORTANT: Before disassembling the coring crankshaft, label location and orientation of components that are to be removed. Correct component location and orientation are necessary for proper aerator operation.

NOTE: The connecting rod assemblies for ProCore SR54 and SR70 aerators are very similar. The ProCore SR54 is shown in Figure 8.

Removal (Fig. 8)

1. Position aerator on a firm, level surface. If aerator is attached to tractor, disengage PTO, apply tractor parking brake, stop engine and remove key from the ignition switch.

2. Unlatch, open and support rear hood to allow access to coring crankshaft.

3. Rotate coring crankshaft to allow access to crank pin (item 1) and hex nut (item 14) for connecting rod to be removed.

4. Insert block of wood between aerator frame and connecting rod to prevent the crankshaft from turning. Using crankshaft nut wrench (see Special Tools), loosen, but do not remove, hex nut (item 14).

5. Support connecting rod that is to be removed to prevent it from falling.

WARNING

As crankshaft components are removed from machine, the crankshaft will become out of balance and may rotate quickly, creating pinch points and potential for personal injury. Be cautious when disassembling the coring crankshaft.

IMPORTANT: When removing cap screw (item 2) and crank pin (item 1), note orientation for proper assembly.

6. For connecting rod that is to be removed, remove lock nut (item 12) and cap screw (item 2) that secure lower end of connecting rod to linkage arms.

7. For connecting rod that is to be removed, remove hex nut (item 14), clipped washer (item 13) and crank pin (item 1) that secure upper end of connecting rod to coring crankarms.

8. Remove connecting rod from aerator. Locate and retrieve outer bushings (items 3 and 6) from both ends of connecting rod.

9. If necessary, remove ball bearings, bearing spacer and retaining rings from connecting rod. Discard removed bearings.

Installation (Fig. 8)

1. If bearings were removed from upper bore of connecting rod, install new bearings into upper bore.

   A. Install a retaining ring into one of the grooves in upper bore of rod. Make sure that retaining ring is properly seated in groove.

   B. Press first ball bearing into connecting rod bore until the bearing contacts the installed retaining ring.

   C. Individually, press three more bearings into connecting rod bore until the bearing contacts the previously installed bearing.

   D. After all four (4) bearings have been pressed into connecting rod bore, install second retaining ring. Make sure that retaining ring is properly seated in groove.

2. If bearings were removed from lower bore of connecting rod, install new bearings into lower bore.

   A. Install two (2) retaining rings into the grooves in lower bore of rod. Make sure that retaining rings are properly seated in grooves.

   B. Press a new bearing into one side of the connecting rod bore until the bearing contacts installed retaining ring. Then press second new bearing into bore so that it contacts first bearing.

   C. Insert bearing spacer into lower rod bore.

   D. Press final two (2) new bearings into housing following above procedure. Make sure that bearing spacer is centered in rod bore.

3. Apply antiseize lubricant liberally to bearing surfaces of crank pin (item 1) and cap screw (item 2).

4. Place outer bushings (items 3 and 6) to both ends of connecting rod.

NOTE: When installing crank pin (item 1), use bullet tool SG255001 (see Special Tools in this chapter) to prevent thread damage to crank pin.

5. Position connecting rod assembly to coring crankshaft and linkage arms. Insert crank pin (item 1) through crank arms and upper connecting rod bearings.

NOTE: When installing cap screw (item 2), use bullet tool SG255002 (see Special Tools in this chapter) to prevent thread damage to screw.

6. Insert cap screw (item 2) through linkage arms and lower connecting rod bearings.

7. Slide clipped washer (item 13) onto crank pin (item 1) and align washer flat with step in crank arm. Thread hex nut (item 14) onto crank pin.

8. Thread lock nut (item 12) onto cap screw (item 2).

9. Insert block of wood between aerator frame and connecting rod to prevent the crankshaft from turning and then properly torque connecting rod fasteners:

   A. Torque lock nut (item 12) on cap screw to **265 ft-lb (359 N-m)**.

   B. Torque hex nut (item 14) on crank pin to **950 ft-lb (1288 N-m)**.

10. After assembly, rotate coring crankshaft by hand to make sure that no binding occurs.

11. Lower and secure rear hood.

Coring Crankshaft (SR54)

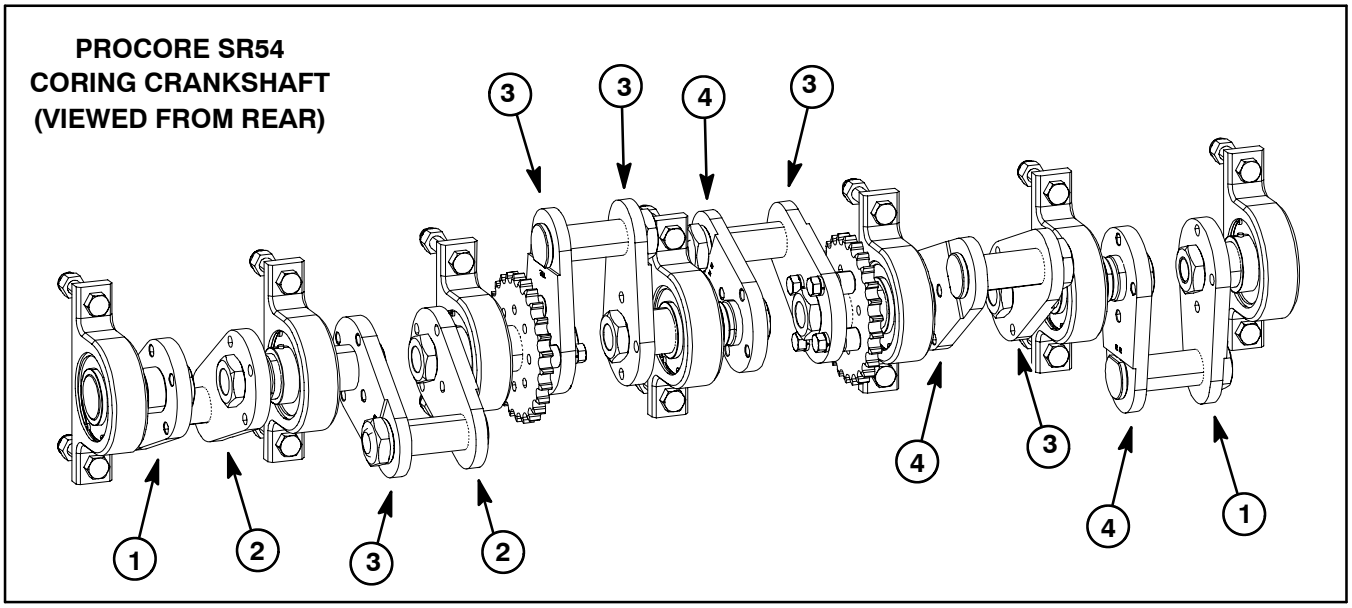

Figure 9

1. **Crank arm (2 used)**
2. **Crank arm (2 used)**
3. **Crank arm (5 used)**
4. **Crank arm (3 used)**

The ProCore SR54 coring crankshaft uses four (4) different crank arms. For identification purposes, the crank arms and crankshaft timing are shown in Figure 9. Refer to your Parts Catalog to identify part numbers for crankshaft components.

Coring Crankshaft (SR70)

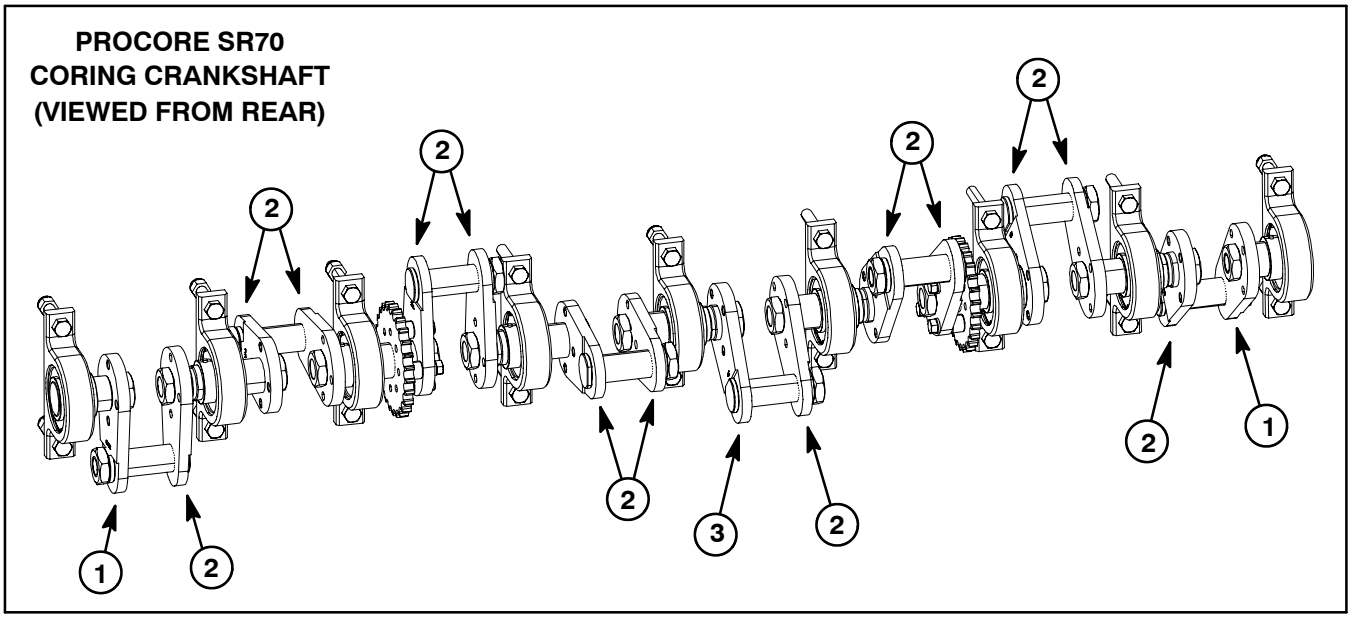

Figure 10

1. **Crank arm (2 used)**
2. **Crank arm (13 used)**
3. **Crank arm (1 used)**

The ProCore SR70 coring crankshaft uses three (3) different crank arms. For identification purposes, the crank arms and crankshaft timing are shown in Figure 10. Refer to your Parts Catalog to identify part numbers for crankshaft components.

Coring Crankshaft Bearing Housings

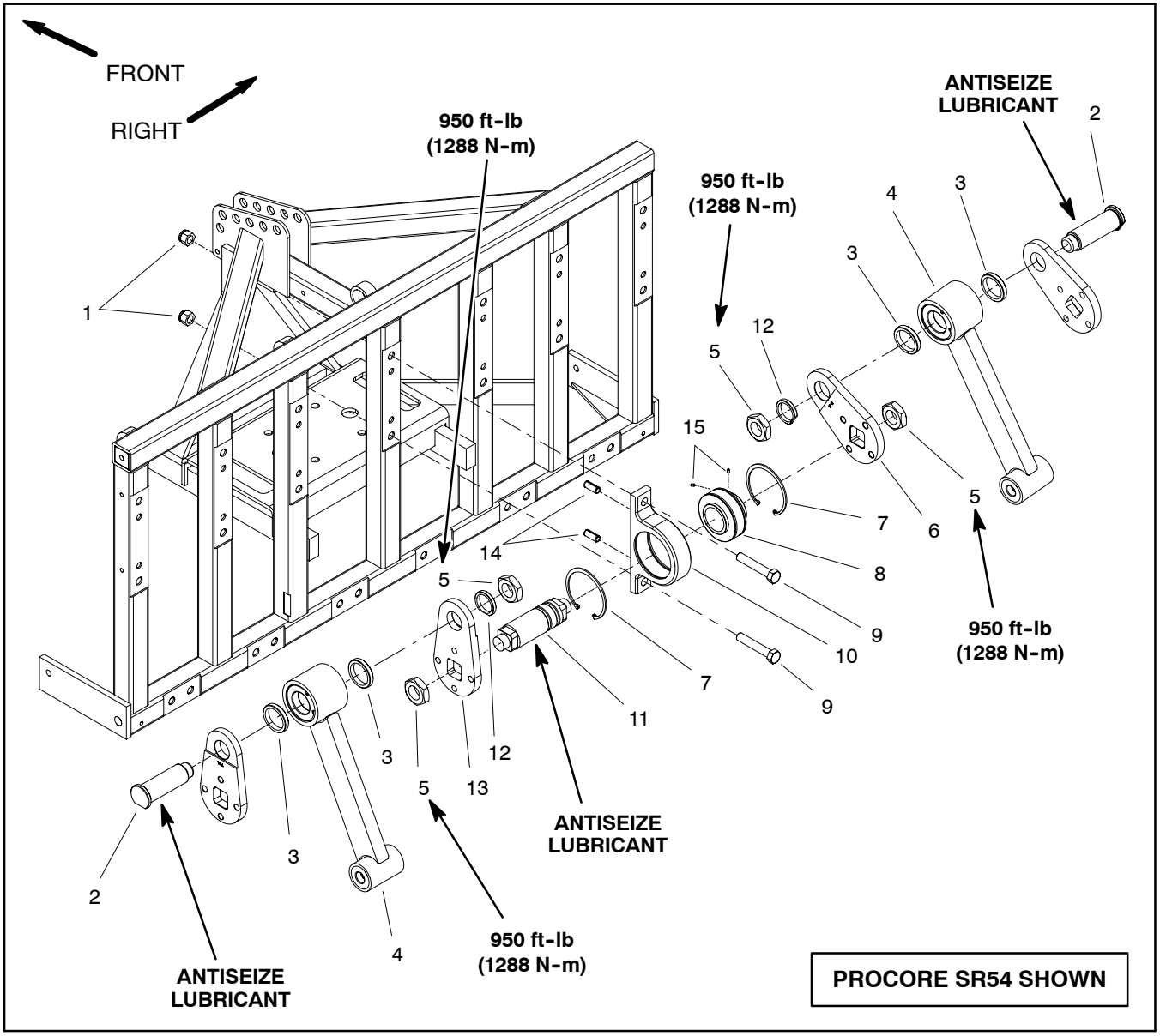

Figure 11

1. Lock nut
2. Crank pin
3. Outer bushing
4. Connecting rod assembly
5. Hex nut
6. Crank arm
7. Retaining ring
8. Ball bearing
9. Cap screw
10. Bearing housing
11. Crank shaft
12. Clipped washer
13. Crank arm
14. Spring pin
15. Set screw

IMPORTANT: Before disassembling the coring crankshaft, label location and orientation of all components that are to be removed. Correct component location and orientation are necessary for proper aerator operation.

NOTE: The crankshaft bearing housing assemblies for ProCore SR54 and SR70 aerators are very similar. The ProCore SR54 is shown in Figure 11.

NOTE: Many of the coring crankshaft components depend on proper orientation. Crank pin (item 2) head position, crank arm (item 13) location on the coring crankshaft, crank arm (item 13) angle on the crank shaft (item 11), crank shaft (item 11) groove orientation and ball bearing (item 8) flange direction all need to be correctly placed for proper aerator operation. During bearing housing removal, carefully note position of components to allow proper assembly.

Removal (Fig. 11)

1. Position aerator on a firm, level surface. If aerator is attached to tractor, disengage PTO, apply tractor parking brake, stop engine and remove key from the ignition switch.

2. Unlatch, open and support back cover to allow access to coring crankshaft.

3. If bearing housing with drive chain attached is to be removed, remove coring head drive chain (see Coring Head Drive Chain Removal in this section).

WARNING

As crankshaft components are removed from machine, the crankshaft will become out of balance and may rotate quickly, creating pinch points and potential for personal injury. Be cautious when disassembling the coring crankshaft.

IMPORTANT: When removing crank pin (item 2), note orientation of crank pin head for proper assembly.

4. Remove crank pins and connecting rods on both sides of bearing housing that is to be removed (see Connecting Rod Removal in this section).

5. Support bearing housing assembly to prevent it from falling. Remove two (2) cap screws and lock nuts that secure bearing housing assembly to coring head frame. Remove bearing housing assembly (with crank arms attached) from machine.

6. Disassemble bearing housing assembly:

IMPORTANT: The crank arms on either side of a bearing housing are different. Before bearing housing disassembly, make sure to note location and orientation of crank arms.

A. Note crank arm alignment with each other for assembly purposes. Incorrect alignment of crank arms will prevent smooth aerator operation and will lead to aerator damage. If desired, use a marker to make a **diagonal** line across the bearing housing and crank arms for assembly purposes.

B. Secure bearing housing assembly in a vise.

C. Remove the hex nut (item 5) that secures one of the crank arms (item 6 or 13) to crank shaft (item 11).

D. Slide crank arm from crank shaft.

E. If sprocket is attached to removed crank arm, remove sprocket if necessary (Fig. 12).

F. Loosen set screws (item 15) that secure bearing to crank shaft.

G. Slide crank shaft with attached crank arm from bearing housing. Note orientation of grooves in crank shaft for assembly purposes.

H. If necessary, remove retaining rings and bearing from bearing housing. Note orientation of bearing flange for assembly purposes. Discard bearing if removed from housing.

I. If removal of the second crank arm is necessary, make sure that alignment of crank arm to crank shaft is noted and then remove hex nut (item 5) and second crank arm from crank shaft.

7. If necessary, remove and discard spring pins (item 14).

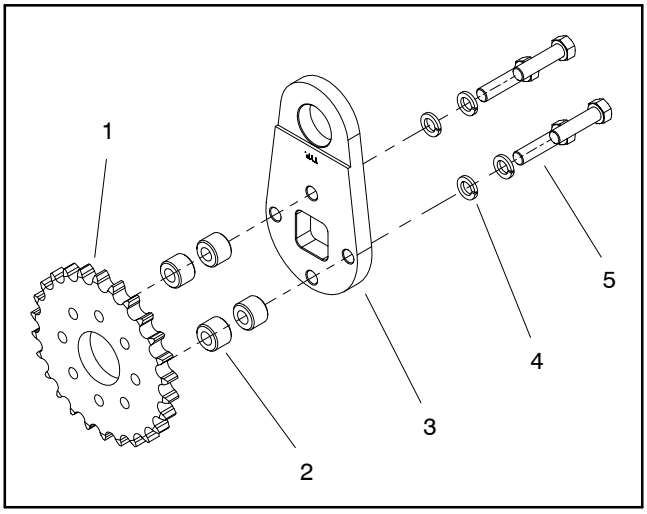

Figure 12

1. **Sprocket**
2. **Spacer (4 used)**
3. **Crank arm**
4. **Lock washer (4 used)**
5. **Cap screw (4 used)**

Installation (Fig. 11)

1. If bearing was removed from bearing housing, install new bearing into housing:

A. Install a retaining ring into one of the grooves in bearing housing. Make sure that retaining ring is properly seated in groove.

B. Position bearing to bearing housing so bearing flange orientation is correct. Install new bearing into bearing housing by pressing on outer race of bearing.

C. Install second retaining ring into bearing housing groove to secure bearing. Make sure that retaining ring is properly seated in groove.

2. If spring pins (item 14) were removed from frame, drive new spring pins into aerator frame holes.

3. Install components to bearing housing assembly:

   A. If a removed crank arm included a drive sprocket, install sprocket if it was removed (Fig. 12).

   B. If both crank arms were removed from crank shaft, use notes made during disassembly to properly orientate one of the crank arms (items 6 or 13) and slide onto crank shaft. Install hex nut onto crank shaft threads to secure crank arm to crank shaft.

   C. Apply antiseize lubricant liberally to crank shaft (item 11). Noting orientation of crank shaft grooves from disassembly, slide crank shaft with attached crank arm into bearing housing. Do not tighten bearing set screws (item 15) at this time.

   D. Using notes made during disassembly, properly orientate second crank arm (items 6 or 13) and slide onto crank shaft. Install hex nut onto crank shaft threads to secure crank arm to crank shaft.

   E. Secure bearing housing assembly in a vise and fully tighten hex nuts to secure assembly. Torque hex nuts from **950 ft-lb (1288 N-m)**.

4. Position bearing housing assembly (with crank arms attached) to spring pins on aerator frame. Install two (2) cap screws and lock nuts to secure bearing housing assembly to coring head frame.

5. Install crank pins and connecting rods on both sides of bearing housing (see Connecting Rod Installation in this section).

6. Rotate coring crankshaft to allow access to hex nuts (item 5) that secure crank arms and connecting rods on both sides of crankshaft bearing housing.

7. Insert block of wood between aerator frame and connecting rod to prevent the crankshaft from turning. Torque hex nuts (item 5) that secure crank arms and connecting rods on both sides of crankshaft bearing housing to **950 ft-lb (1288 N-m)**.

8. Tighten set screws (item 15) to secure ball bearing flange to crank shaft.

9. After assembly, rotate coring crankshaft by hand to make sure that no binding occurs.

IMPORTANT: When installing coring head drive chains, make sure that one of the chains is installed and properly tensioned before installing second chain.

10. If removed, install coring head drive chain (see Coring Head Drive Chain Installation in this section). Make sure that coring crankshaft is properly positioned before installing drive chain and also that chain is properly tensioned after installation.

11. Lower and secure back cover.

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Coring Head Drive Chain

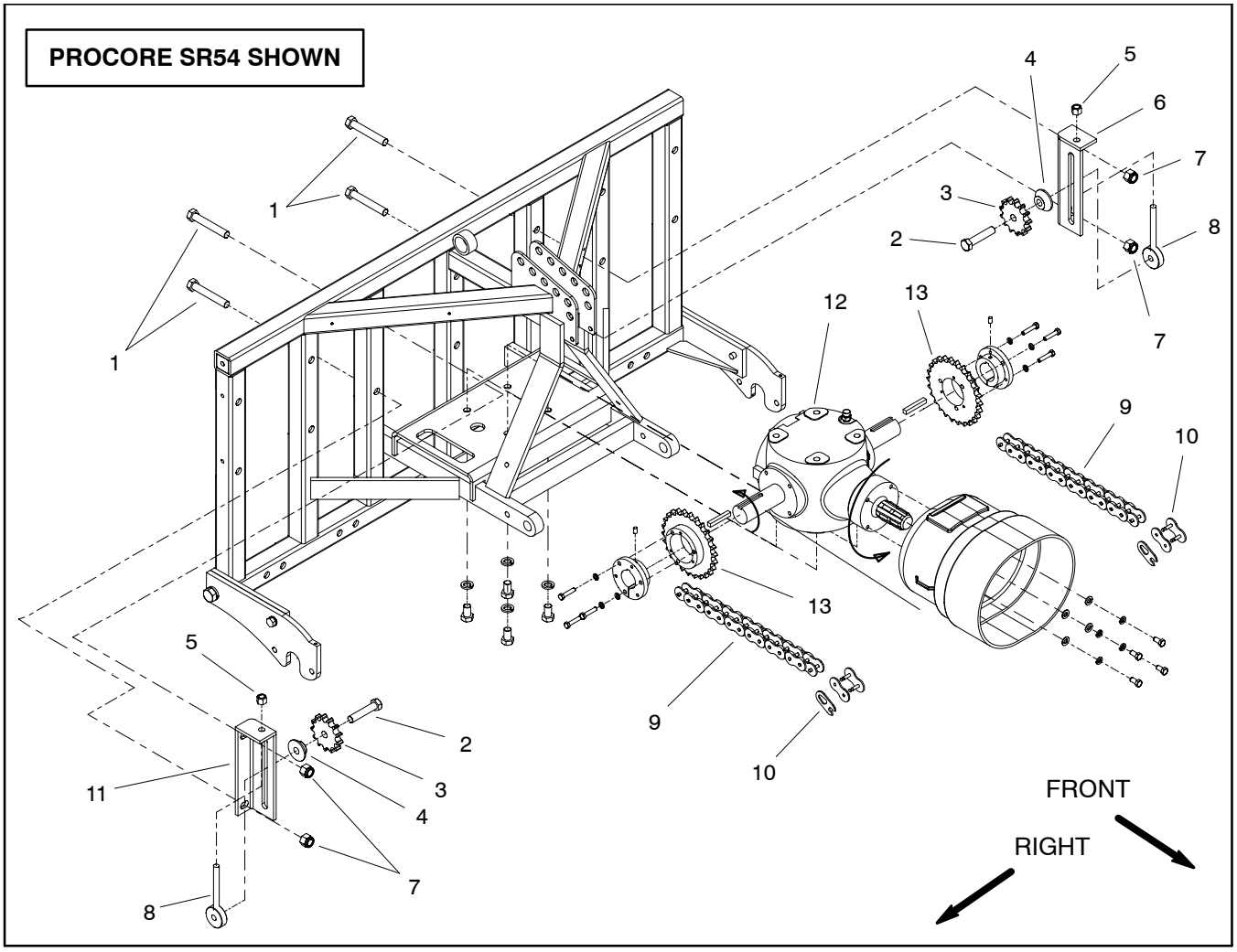

Figure 13

1. **Cap screw**
2. **Cap screw**
3. **Idler sprocket**
4. **Offset spacer**
5. **Lock nut**
6. **LH idler bracket**
7. **Lock nut**
8. **Idler rod**
9. **Drive chain**
10. **Master link assembly**
11. **RH idler bracket**
12. **Gearbox**
13. **Gearbox sprocket**

NOTE: The coring head drive chain assemblies for ProCore SR54 and SR70 aerators are very similar. The ProCore SR54 is shown in Figure 13.

Disassembly (Fig. 13)

1. Position aerator on a firm, level surface. If aerator is attached to tractor, disengage PTO, apply tractor parking brake, stop engine and remove key from the ignition switch.

2. Raise and support rear hood.

3. Loosen cap screw (item 2) and lock nut (item 5) to remove idler tension on drive chain.

4. Rotate coring crankshaft until drive chain master link is located at gearbox sprocket. Note direction of closed end of master link clip for assembly purposes. Remove clip and master link from drive chain. Locate and remove master link O−rings.

5. Remove drive chain from gearbox, coring crankshaft and idler sprockets (Fig. 14).

6. If necessary, remove idler assembly using Figure 13 as a guide.

7. If necessary, remove sprocket(s) from gearbox shaft (see Coring Head Drive Sprockets Disassembly in this section).

8. If sprocket removal from coring crankshaft is necessary, remove coring crankshaft bearing housing that includes sprocket and remove sprocket from crank arm (see Coring Crankshaft Bearing Housing Removal in this section).

Assembly (Fig. 13)

1. If coring crankshaft sprocket was removed, secure sprocket to crank arm and install coring crankshaft bearing housing (see Coring Crankshaft Bearing Housing Installation in this section).

2. If sprockets were removed from gearbox shaft, install sprockets to gearbox shaft (see Coring Head Drive Sprockets Assembly in this section).

3. If idler assembly parts were removed from frame, install idler components using Figure 13 as a guide.

4. Using a suitable straight edge, check that alignment between gearbox, coring crankshaft and idler sprockets is correct. If needed, adjust sprocket location on gearbox shaft to align sprockets (see Coring Head Drive Sprockets Assembly in this section).

IMPORTANT: When installing drive chains, install and properly tension one of the drive chains. Then, install and tension the second chain.

5. If both drive chains were removed, install first chain:

   A. Position drive chain to gearbox sprocket, pull lower run of chain tight and align with coring crankshaft sprocket teeth. If necessary, slightly rotate coring crankshaft so that chain remains tight when aligned with sprocket teeth. Route chain over idler sprocket and back to gearbox sprocket (Fig. 14). Do not allow lower run of chain to have excessive slack.

   B. Apply grease to master link O-rings. Place two (2) O-rings on master link pins and install into ends of drive chain. Place final two (2) O-rings on master link pins and install side plate.

   C. Install master link clip so that the closed end is facing the direction of chain rotation.

   IMPORTANT: To prevent gearbox damage, do not overtighten drive chains. Drive chains should have 1/2" (12.7 mm) total deflection when properly adjusted.

   D. Adjust idler sprocket location with lock nut (item 5) so that chain has 1/2" (12.7 mm) total deflection at mid-span between sprockets. Make sure that cap screw (item 2) is fully tightened after chain adjustment is completed.

6. Block crankshaft to prevent it from rotating. Install and adjust second drive chain using procedure listed in step 5 above.

7. Lower and secure rear hood.

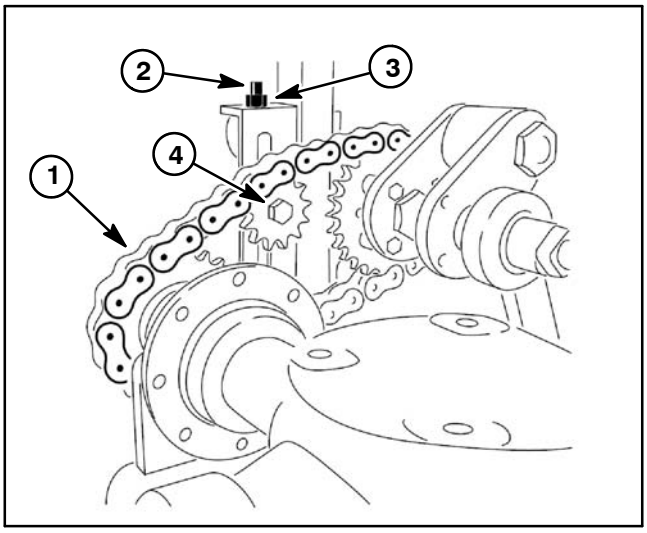

Figure 14

1. **Drive chain**
2. **Idler rod**
3. **Lock nut**
4. **Cap screw**

Coring Head Drive Sprockets

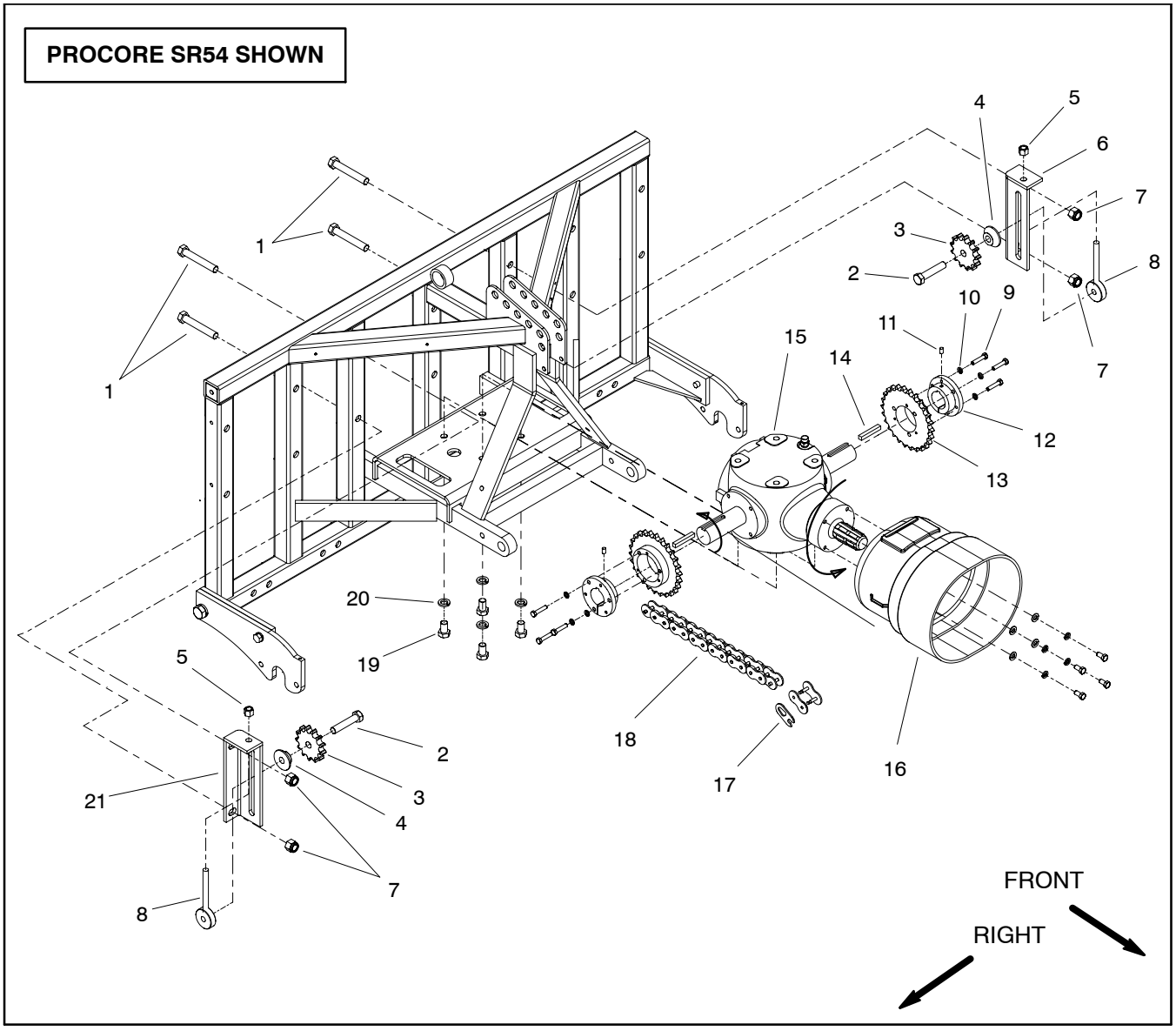

Figure 15

1. **Cap screw**
2. **Cap screw**
3. **Idler sprocket (2 used)**
4. **Offset spacer**
5. **Lock nut**
6. **LH idler bracket**
7. **Lock nut**
8. **Idler rod**
9. **Cap screw (3 used per hub)**
10. **Lock washer (3 used per hub)**
11. **Set screw**
12. **Sprocket hub (2 used)**
13. **Gearbox sprocket (2 used)**
14. **Square key (2 used)**
15. **Gearbox**
16. **PTO driveshaft shield**
17. **Master link assembly (2 used)**
18. **Drive chain (2 used)**
19. **Cap screw (4 used)**
20. **Lock washer (4 used)**
21. **RH idler bracket**

NOTE: The coring head drive sprockets used on Pro-Core SR54 and SR70 aerators are very similar. The Pro-Core SR54 is shown in Figure 15.

Disassembly (Fig. 15)

1. Position aerator on a firm, level surface. If aerator is attached to tractor, disengage PTO, apply tractor parking brake, stop engine and remove key from the ignition switch.

2. Raise and support rear hood.

3. Remove front screens (see Covers Removal in the Service and Repairs section of Chapter 3 – Chassis).

4. Remove drive chains (see Coring Head Drive Chain Disassembly in this section).

5. Remove sprocket(s) from gearbox shaft:

A. Measure distance from end of gearbox output shaft to location of sprocket hub for assembly purposes. Record measurement.

B. Remove three (3) cap screws and lock washers that secure sprocket to sprocket hub.

IMPORTANT: Excessive or unequal pressure on the cap screws can break the sprocket hub flange. When removing sprocket from hub, tighten screws progressively and evenly.

C. Insert three (3) cap screws into threaded removal holes of the sprocket hub. Tighten screws progressively and evenly until the sprocket is loose on the hub. Position sprocket away from hub.

D. Remove set screw that secures sprocket hub to gearbox shaft.

E. Remove hub, sprocket and square key from gearbox shaft.

6. If sprocket removal from coring crankshaft is necessary, remove coring crankshaft bearing housing that includes sprocket and remove sprocket from crank arm (see Coring Crankshaft Bearing Housing Removal in this section).

Assembly (Fig. 15)

1. If coring crankshaft sprocket was removed, secure sprocket to crank arm and install coring crankshaft bearing housing (see Coring Crankshaft Bearing Housing Installation in this section).

2. Install sprockets to gearbox shaft:

A. Make sure that tapered surfaces of sprocket and sprocket hub are thoroughly clean (no oil, grease, dirt, rust, etc.).

B. Position square key in gearbox shaft slot. Apply antiseize lubricant to bore of sprocket hub.

C. Slide sprocket and hub onto gearbox shaft making sure that tapered surfaces of sprocket and hub align.

D. Position hub location from end of gearbox shaft as measured before removal. Secure hub to gearbox shaft with set screw.

IMPORTANT: When securing sprocket and sprocket hub, tighten cap screws in three (3) equal steps and in a circular pattern to prevent hub flange damage.

E. Align threaded holes of sprocket with non-threaded holes of sprocket hub and install three (3) cap screws with lock washers. Tighten cap screws in three (3) equal steps and in a circular pattern to secure sprocket and sprocket hub.

3. Using a suitable straight edge, check that alignment between gearbox, coring crankshaft and idler sprockets is correct. If needed, readjust sprocket location on gearbox shaft to align sprockets.

4. Install and tension drive chains (see Coring Head Drive Chain Assembly in this section).

5. Install front screens to machine (see Covers Installation in the Service and Repairs section of Chapter 3 – Chassis).

6. Lower and secure rear hood.

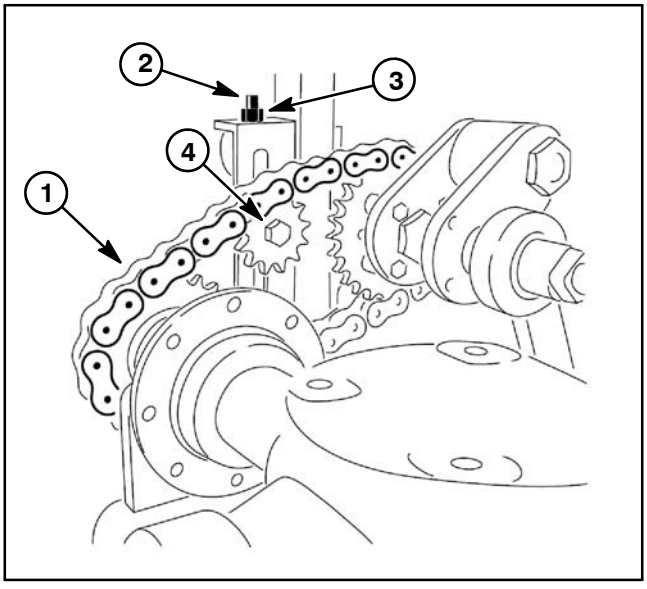

Figure 16

1. Drive chain
2. Jam rod
3. Lock nut
4. Cap screw

Gearbox

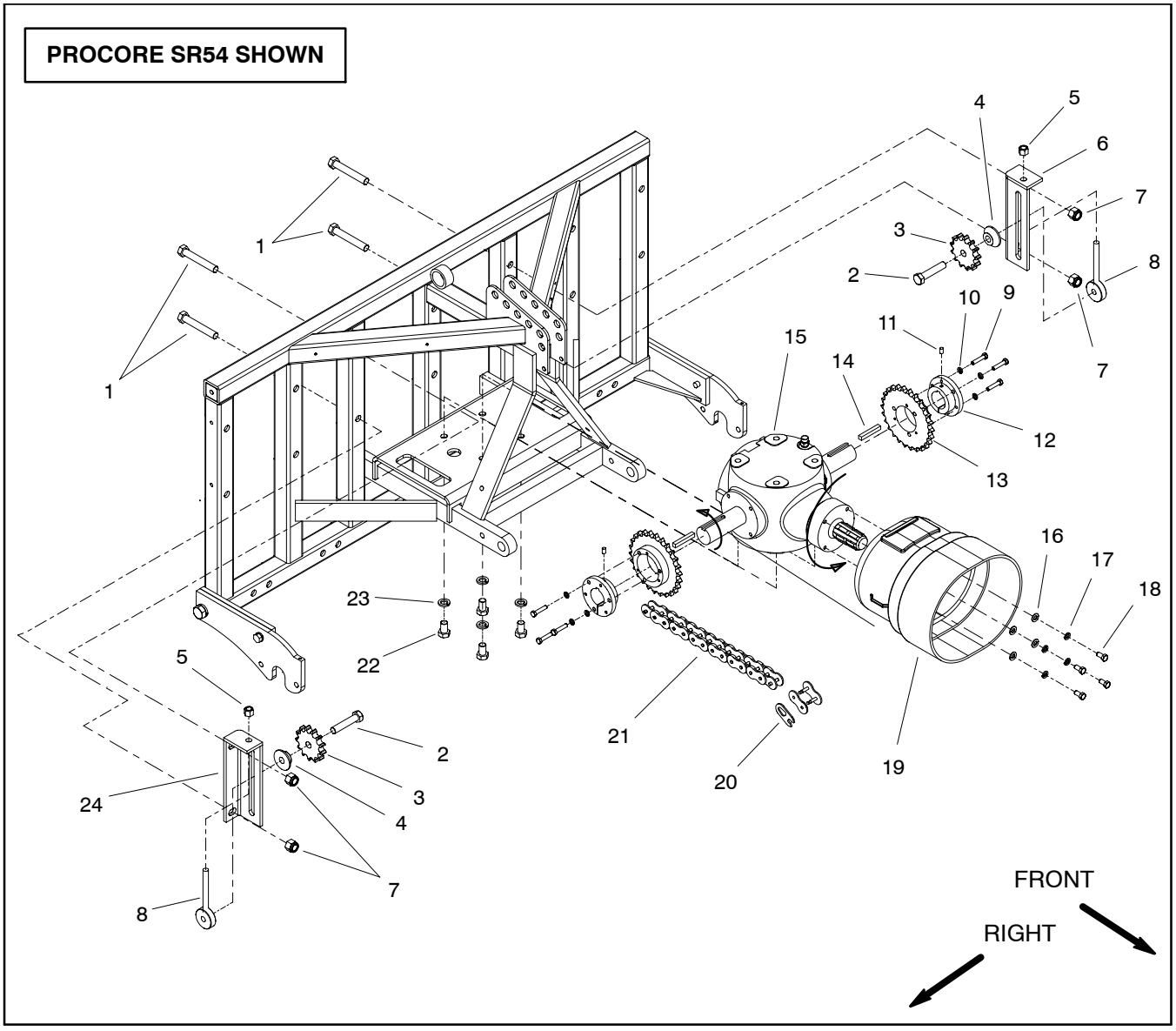

Figure 17

1. **Cap screw**
2. **Cap screw**
3. **Idler sprocket (2 used)**
4. **Offset spacer**
5. **Lock nut**
6. **LH idler bracket**
7. **Lock nut**
8. **Idler rod**
9. **Cap screw (3 used per hub)**
10. **Lock washer (3 used per hub)**
11. **Set screw**
12. **Sprocket hub (2 used)**
13. **Gearbox sprocket (2 used)**
14. **Square key (2 used)**
15. **Gearbox**
16. **Flat washer (4 used)**
17. **Lock washer (4 used)**
18. **Cap screw (4 used)**
19. **PTO driveshaft shield**
20. **Master link assembly (2 used)**
21. **Drive chain (2 used)**
22. **Cap screw (4 used)**
23. **Lock washer (4 used)**
24. **RH idler bracket**

NOTE: Gearbox removal and installation on ProCore SR54 and SR70 aerators is very similar. The ProCore SR54 is shown in Figure 17.

Gearbox Removal (Fig. 17)

1. Position aerator on a firm, level surface. If aerator is attached to tractor, disengage PTO, apply tractor parking brake, stop engine and remove key from the ignition switch.

2. Remove screens from aerator frame (see Covers Removal in the Service and Repairs section of Chapter 3 – Chassis).

3. Drain lubricant from gearbox.

4. Disconnect PTO driveshaft from gearbox input shaft (see PTO Driveshaft Removal in the Service and Repairs section of Chapter 3 – Chassis).

5. Remove four (4) cap screws, lock washers and flat washers that secure driveshaft shield (item 19) to gearbox. Remove shield.

6. Remove drive chains from gearbox sprockets (see Coring Head Drive Chain Disassembly in this section).

7. Remove drive sprocket and sprocket hub from both gearbox output shafts (see Coring Head Drive Sprockets Disassembly in this section).

8. On SR70 aerators, remove saddle bolts and lock nuts that secure gearbox flanges to aerator frame brackets (Fig. 18).

9. Remove four (4) cap screws and lock washers that secure gearbox to aerator frame.

CAUTION

To prevent personal injury, make sure that gearbox is supported as it is removed from the machine. Refer to Specifications in this chapter for gearbox weight.

10. Carefully remove gearbox from machine.

NOTE: For gearbox disassembly and assembly information, refer to the Service and Repairs section of Chapter 7 – Gearbox Service.

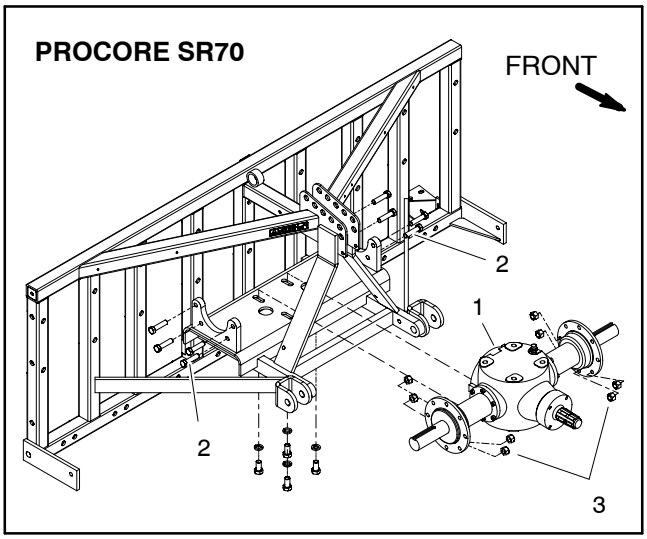

Figure 18

1. **Gearbox**
2. **Saddle bolt (8 used)**
3. **Lock nut (8 used)**

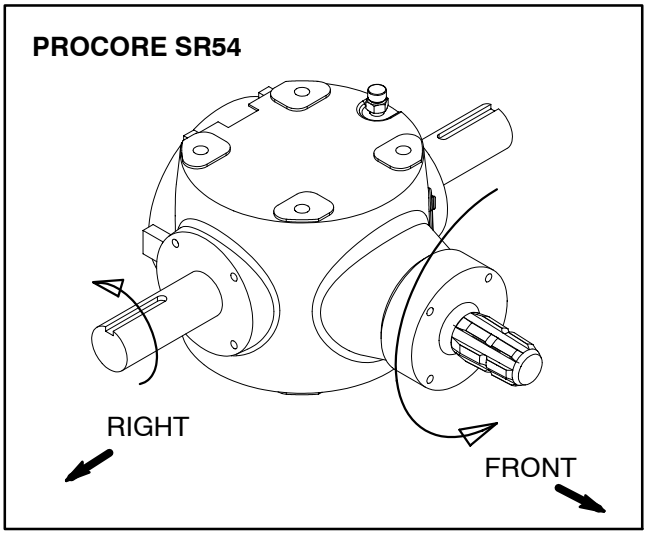

Figure 19

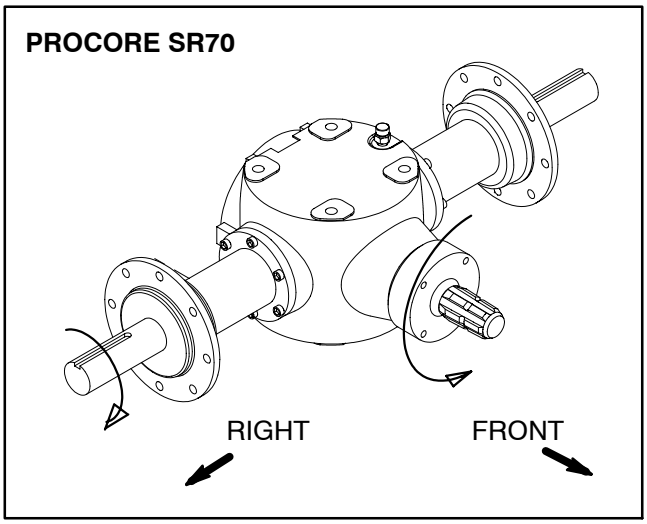

Figure 20

Gearbox Installation (Fig. 17)

IMPORTANT: If a gearbox is incorrectly assembled or installed (e.g. output shaft installed into gearbox in reverse direction or gearbox placed on frame upside down), there is a possibility that gearbox output shaft rotation will be incorrect for proper aerator operation. After placing the gearbox on the frame, make sure that rotation of the input shaft results in the correct output shaft rotation direction. Figure 19 shows correct shaft rotation direction for the SR54 and SR54S. Figure 20 shows correct shaft rotation direction for the SR70 and SR70S. If rotation is incorrect, check gearbox assembly and installation before proceeding with installation procedure.

CAUTION

To prevent personal injury, make sure that gearbox is supported as it is installed to the machine. See Specifications in this chapter for gearbox weight.

1. Position gearbox to aerator frame. Secure gearbox to frame with four (4) cap screws and lock washers.

2. On SR70 aerators, secure gearbox flanges to aerator frame brackets with bolts and lock nuts (Fig. 18).

3. Install sprocket and sprocket hub to both gearbox output shafts (see Coring Head Drive Sprockets Assembly in this section).

4. Install both drive chains (see Coring Head Drive Chain Assembly in this section). Make sure that drive chain is properly adjusted after assembly.

5. Position driveshaft shield (item 19) to gearbox and secure with four (4) cap screws, lock washers and flat washers.

6. Connect PTO driveshaft to gearbox input shaft (see PTO Driveshaft Installation in the Service and Repairs section of Chapter 3 – Chassis).

7. Fill gearbox with proper lubricant (see Operator's Manual).

8. Install screens to aerator (see Covers Installation in the Service and Repairs section of Chapter 3 – Chassis).

Chapter 5

Coring Head (SR48 & SR72)

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Specifications

Item	Description
ProCore SR48	
Aerating Width	48 inches (1.22 meters)
Number of Connecting Rods	4
Number of Rollers	1
Depth Adjustment	Hydraulic Top Link
Gearbox Lubricant	SAE 80W-90 gear lube
Gearbox Lubricant Capacity	2 US quarts (1.9 liters)
Gearbox Weight (approximate)	109 lbs (50 kg)
ProCore SR72	
Aerating Width	72 inches (1.83 meters)
Number of Connecting Rods	6
Number of Rollers	1
Depth Adjustment	Hydraulic Top Link
Gearbox Lubricant	SAE 80W-90 gear lube
Gearbox Lubricant Capacity	4 US quarts (3.8 liters)
Gearbox Weight (approximate)	220 lbs (100 kg)

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Coring Head

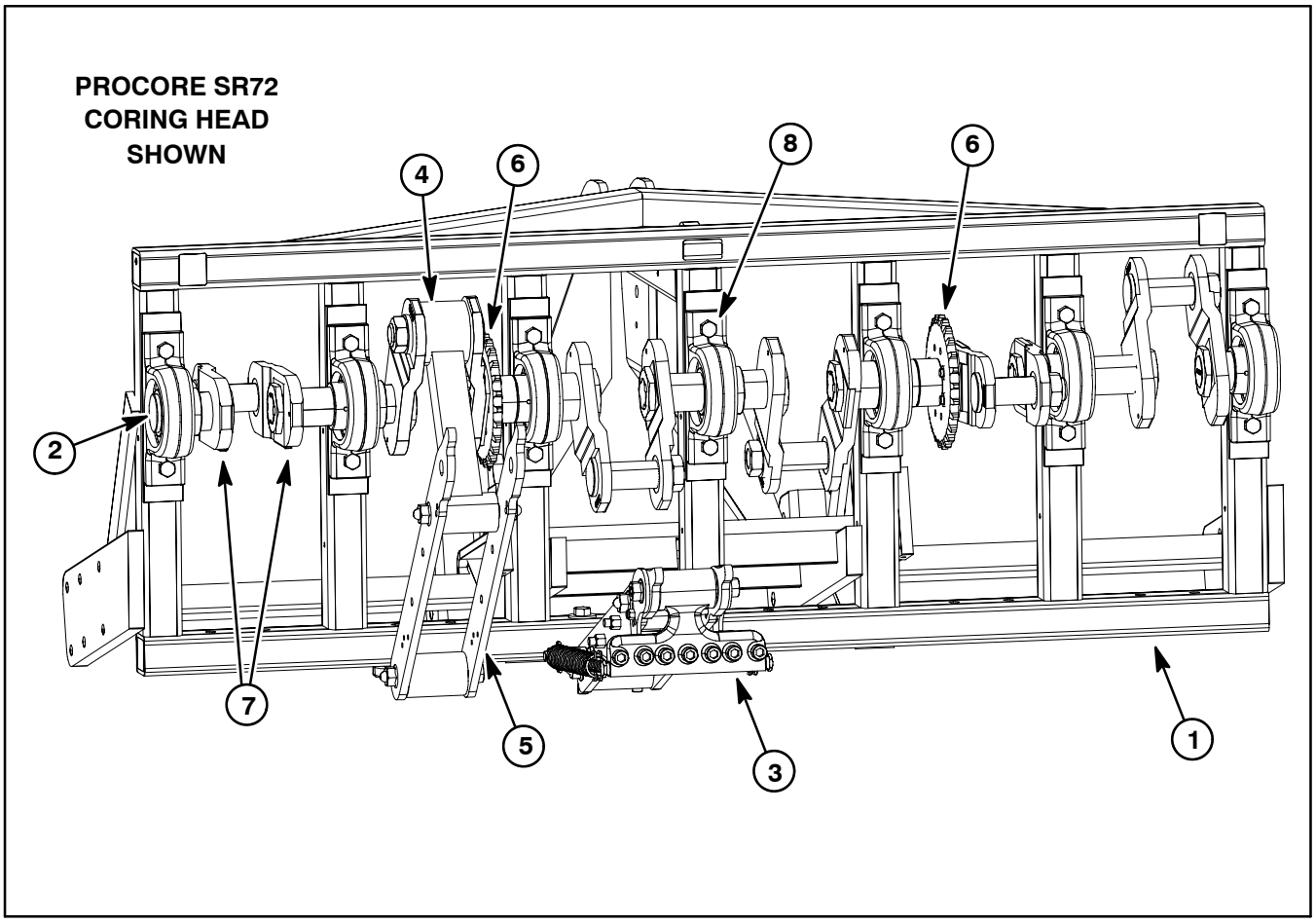

Figure 1

1. **Aerator frame**
2. **Coring crankshaft assembly**
3. **Tine holder**
4. **Connecting rod**
5. **Linkage arm assembly**
6. **Drive chain sprocket**
7. **Crank arm**
8. **Bearing housing assembly**

The coring head of a ProCore SR deep tine aerator consists of the aerator frame, a coring crankshaft assembly, tine holders and aerating tines. The rotating crankshaft assembly operates a number of connecting rods with linkage arm assemblies to provide effective tine motion for deep turf aeration. The SR48 and SR72 aerator frames pivot on a single roller to allow aerating depth control.

Drive for the coring head is provided by the towing tractor PTO output shaft. A gearbox on the ProCore aerator is rotated by a driveshaft connected to the tractor PTO shaft. The aerator gearbox provides rotation for the coring head crankshaft assembly with two (2) drive chains. The drive chains are each tensioned by an adjustable idler sprocket.

The coring crankshaft is composed of multiple crank arms, bearings, bearing housings and crank shafts. The crankshaft assembly is designed and assembled to ensure minimal vibration during aerator operation.

A variety of tines and tine heads are available for use on ProCore SR Series aerators. Refer to the Operator's Manual for available options.

Coring Head Adjustments

See Operator's Manual for adjustment procedures for the coring head on your ProCore SR series aerator.

CAUTION

Never work on the aerator with the tow tractor PTO engaged or engine running. Always disengage the PTO, stop tractor engine, remove key from the ignition switch and wait for all machine movement to stop before performing any service to aerator components.

Special Tools

Order special tools from your Toro Distributor.

Crankshaft Nut Wrench

This three (3) foot long wrench can be used to loosen and remove the fasteners that secure coring head crankshaft crank arms and connecting rods.

Toro Part Number: **SG885300**

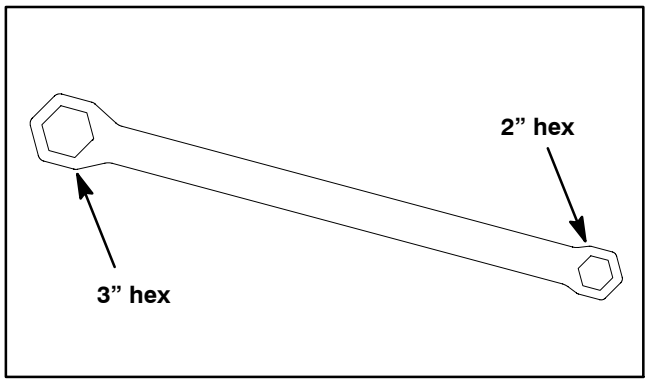

Figure 2

Bullet Tools

Use to protect threads of crankshaft components during assembly of crankshaft, connecting rods and linkage arms. The bullet tool should be installed onto the threads of the crankpin or linkage arm fastener to prevent thread damage when component is installed.

NOTE: On ProCore SR48 and SR72 aerators, bullet tool SG255000 is used for the crankpin and tool SG255002 is used for the wrist pins that secure the linkage arms.

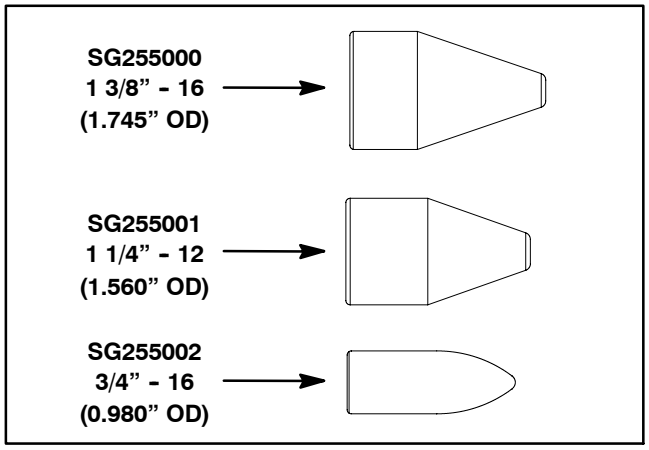

Figure 3

Torque Multiplier

Use in conjunction with an appropriate torque wrench to install and properly torque the fasteners that secure coring head crankshaft crank arms and connecting rods. Obtain this tool locally.

Figure 4

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Linkage Arm Assemblies

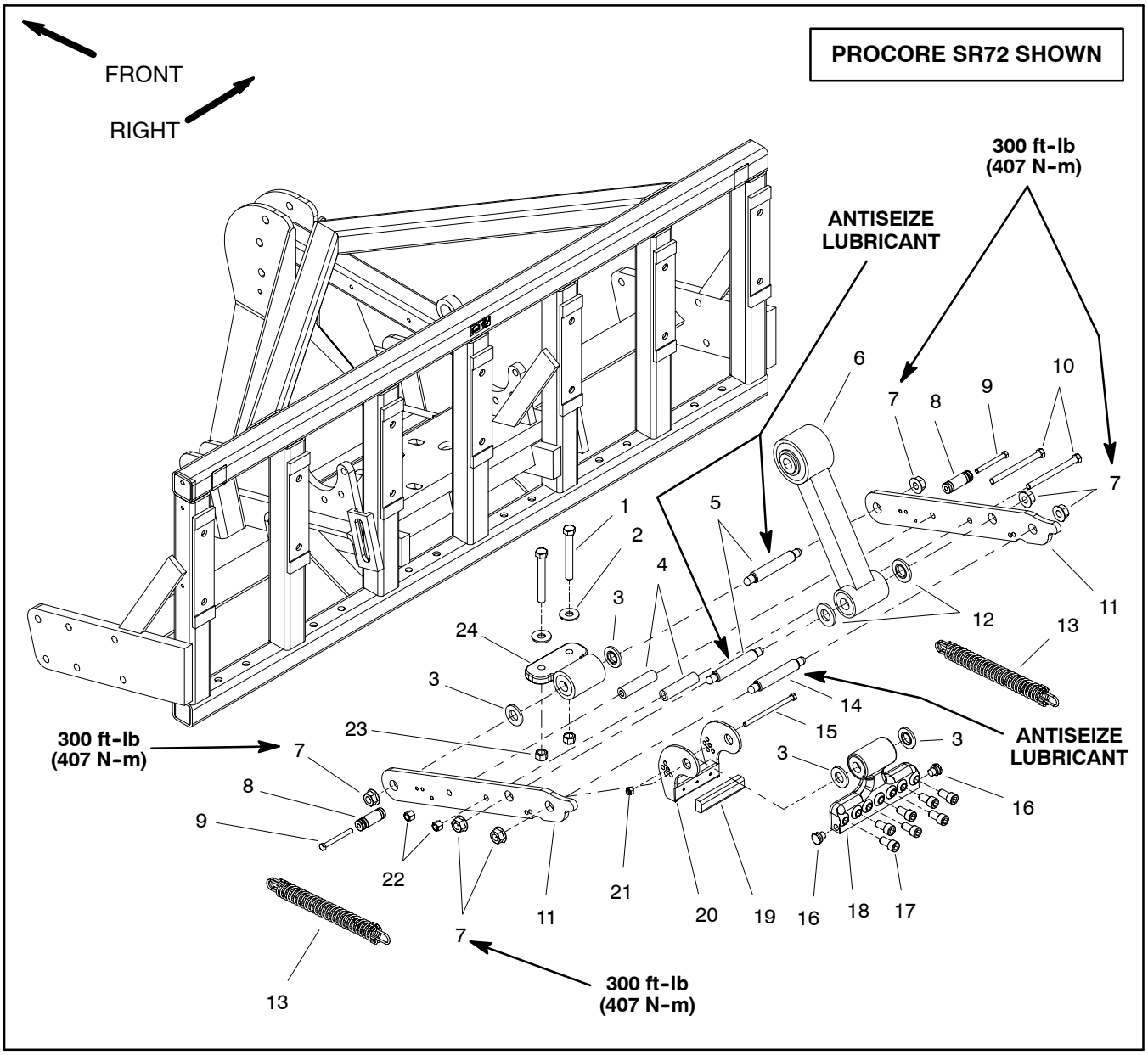

Figure 5

1. Cap screw
2. Flat washer
3. Outer bushing
4. Linkage arm spacer
5. Wrist pin
6. Connecting rod assembly
7. Flange nut
8. Rear spring post
9. Cap screw
10. Cap screw
11. Linkage arm
12. Outer bushing
13. Spring assembly
14. Wrist pin
15. Cap screw
16. Front spring holder
17. Tine head bolt
18. Tine head assembly
19. Bumper pad
20. Camber bracket
21. Lock nut
22. Lock nut
23. Lock nut
24. Hinge assembly

NOTE: The linkage arm assemblies for ProCore SR48 and SR72 series aerators are very similar. The ProCore SR72 is shown in Figure 5.

Disassembly (Fig. 5)

1. Position aerator on a firm, level surface. If aerator is attached to tractor, disengage PTO, apply tractor parking brake, stop engine and remove key from the ignition switch.

CAUTION

Be careful when removing the spring assembly. The spring is under load and may cause personal injury during removal.

2. Remove both spring assemblies from rear spring post (item 8) and front spring holder (item 16).

3. Remove linkage arm components as needed using Figure 5 as a guide.

4. If necessary, disassemble tine head assembly using Figure 6 as a guide.

5. If necessary, disassemble hinge assembly using Figure 7 as a guide.

6. Discard all removed bearings.

Assembly (Fig. 5)

1. If tine head (Fig. 6) or hinge (Fig. 7) assemblies were disassembled:

   A. Make sure that retaining rings are fully seated into grooves in housing.

   B. Press a new bearing into one side of the housing until it contacts installed retaining ring. Then press second new bearing into housing so that it contacts first bearing.

   C. Insert inner bushing into housing.

   D. Press final two (2) new bearings into housing following above procedure.

   E. Make sure that inner bushing is centered in housing.

2. Apply antiseize lubricant to wrist pins (items 5 and 14).

NOTE: When installing wrist pins (items 5 and 14), use bullet tool SG255002 (see Special Tools in this chapter) to prevent wrist pin thread damage.

3. Assemble linkage arm components using Figure 5 as a guide. Torque flange nuts (item 7) to **300 ft-lb (407 N-m)**.

4. Make sure that spring wires are not broken or crossed (Fig. 8). Install both spring assemblies to rear spring post (item 8) and front spring holder (item 16).

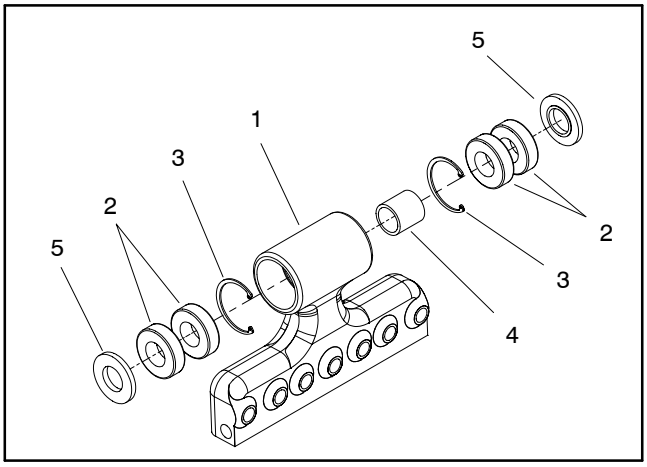

Figure 6

1. **Tine head housing**
2. **Bearing**
3. **Retaining ring**
4. **Inner bushing**
5. **Outer bushing**

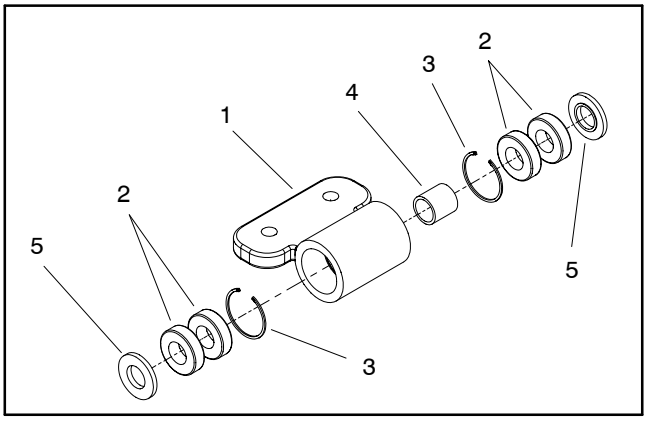

Figure 7

1. **Hinge housing**
2. **Bearing**
3. **Retaining ring**
4. **Inner bushing**
5. **Outer bushing**

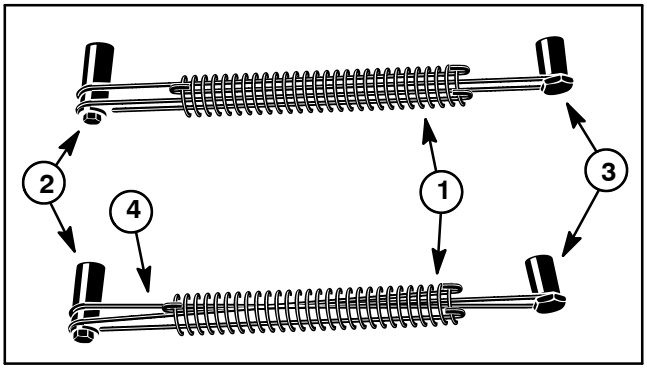

Figure 8

1. **Spring assembly**
2. **Rear spring post**
3. **Front spring holder**
4. **Crossed spring wires**

Connecting Rods

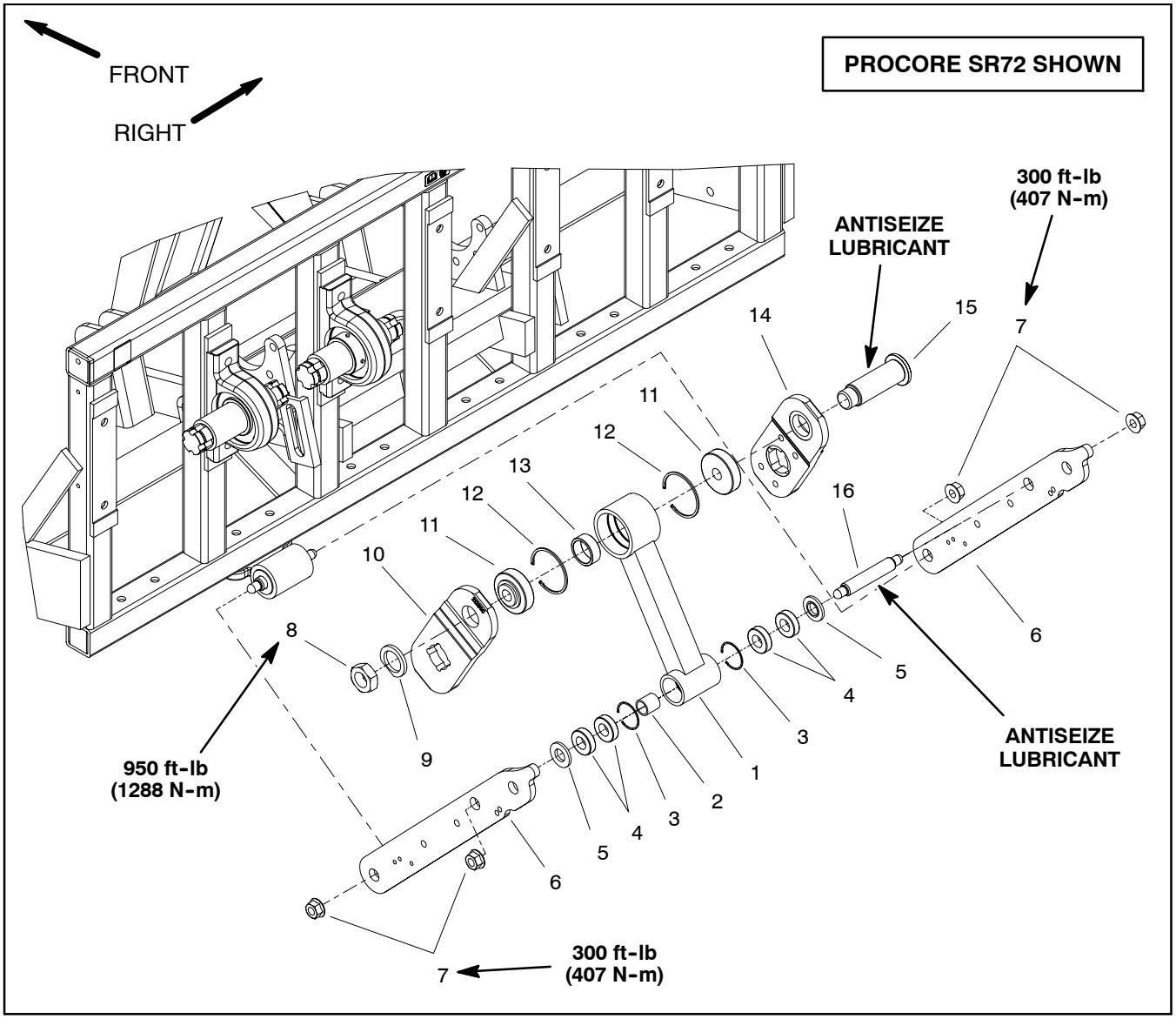

Figure 9

1. Connecting rod
2. Spacer
3. Retaining ring
4. Bearing
5. Outer bushing
6. Linkage arm
7. Flange nut
8. Hex nut
9. Clipped washer
10. Crank arm
11. Bearing
12. Retaining ring
13. Spacer
14. Crank arm
15. Crank pin
16. Wrist pin

IMPORTANT: Before disassembling the coring crankshaft, label location and orientation of components that are to be removed. Correct component location and orientation are necessary for proper aerator operation.

NOTE: The connecting rod assemblies for ProCore SR48 and SR72 series aerators are very similar. The ProCore SR72 is shown in Figure 9.

Removal (Fig. 9)

1. Position aerator on a firm, level surface. If aerator is attached to tractor, disengage PTO, apply tractor parking brake, stop engine and remove key from the ignition switch.

2. Unlatch, open and support rear hood to allow access to coring crankshaft.

3. Rotate coring crankshaft to allow access to crank pin (item 15) and hex nut (item 8) for connecting rod that is to be removed.

4. Insert block of wood between aerator frame and connecting rod to prevent the crankshaft from turning. Using crankshaft nut wrench (see Special Tools), loosen, but do not remove, hex nut (item 8).

5. Remove linkage arm from one side of connecting rod (see Disassembly of Linkage Arm Assemblies in this section).

6. Support connecting rod that is to be removed to prevent it from falling.

WARNING

As crankshaft components are removed from machine, the crankshaft will become out of balance and may rotate quickly, creating pinch points and potential for personal injury. Be cautious when disassembling the coring crankshaft.

IMPORTANT: When removing crank pin (item 15), note crank pin head orientation for proper assembly.

7. For connecting rod that is to be removed, remove hex nut (item 8), clipped washer (item 9) and crank pin (item 15) that secure upper end of connecting rod to coring crank arms.

8. Remove connecting rod from aerator. Locate and retrieve outer bushings (item 5) from small end of connecting rod.

9. If necessary, remove ball bearings, bearing spacer and retaining rings from connecting rod. Discard removed bearings.

Installation (Fig. 9)

1. If bearings were removed from upper bore of connecting rod, install new bearings into upper bore.

   A. Install retaining rings into grooves in upper bore of rod. Make sure that retaining rings are properly seated in grooves.

   B. Insert bearing spacer into rod bore.

   C. Press ball bearings into connecting rod bore until the bearings contact installed retaining rings.

2. If bearings were removed from lower bore of connecting rod, install new bearings into lower bore.

   A. Install two (2) retaining rings into the grooves in lower bore of rod. Make sure that retaining rings are properly seated in grooves.

   B. Press a new bearing into one side of the connecting rod bore until the bearing contacts installed retaining ring. Then press second new bearing into bore so that it contacts first bearing.

   C. Insert bearing spacer into lower rod bore.

   D. Press final two (2) new bearings into housing following above procedure. Make sure that bearing spacer is centered in rod bore.

3. Apply antiseize lubricant to crank pin (item 15) and wrist pin (item 16).

NOTE: When installing connecting rod onto wrist pin, use bullet tool SG255002 (see Special Tools in this chapter) to prevent wrist pin thread damage.

4. Place outer bushings (item 5) to small end of connecting rod. Slide lower end of connecting rod onto wrist pin.

NOTE: When installing crank pin (item 15), use bullet tool SG255000 (see Special Tools in this chapter) to prevent thread damage to crank pin.

5. Position connecting rod to crank arms. Insert crank pin (item 15) through crank arms and upper connecting rod bearings.

6. Slide clipped washer (item 9) onto crank pin (item 15) and align washer flat with step in crank arm. Thread hex nut (item 8) onto crank pin.

7. Install removed linkage arm to side of connecting rod (see Assembly of Linkage Arm Assemblies in this section).

8. Properly torque fasteners:

   A. Torque flange nuts (item 7) that secure linkage arm to **300 ft-lb (407 N-m)**.

   B. Torque hex nut (item 8) on crank pin to **950 ft-lb (1288 N-m)**.

9. After assembly, rotate coring crankshaft by hand to make sure that no binding occurs.

10. Lower and secure rear hood.

Coring Crankshaft (SR48)

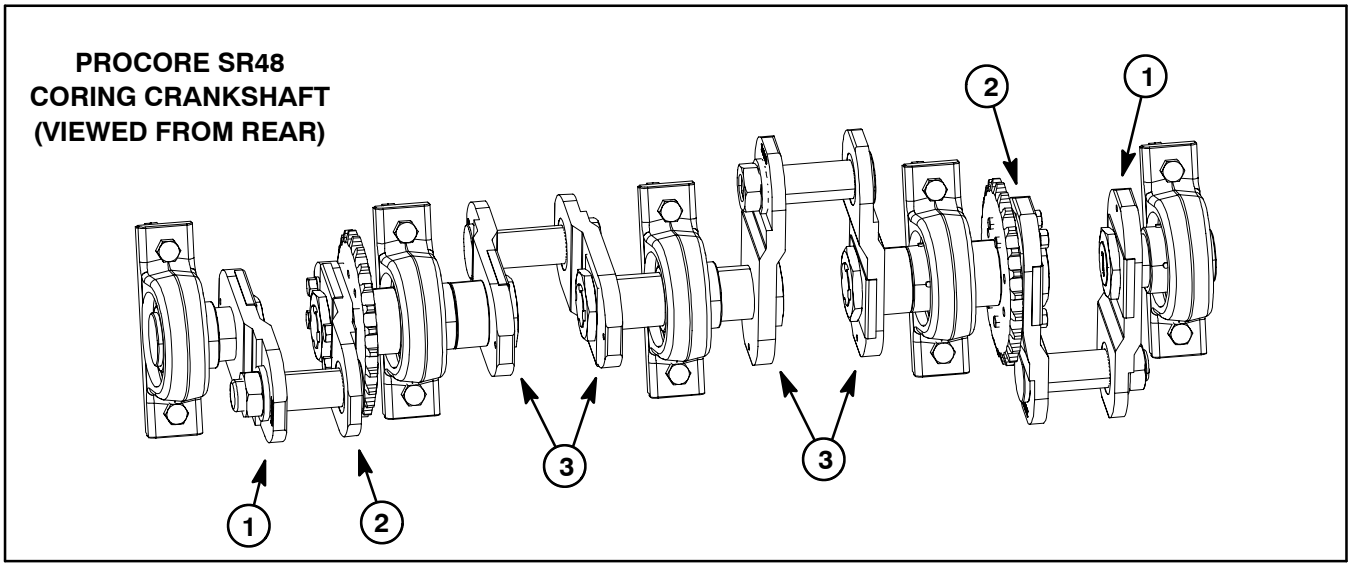

Figure 10

1. **Crank arm (2 used)**
2. **Crank arm (2 used)**
3. **Crank arm (4 used)**

The ProCore SR48 coring crankshaft uses three (3) different crank arms. For identification purposes, the crank arms and crankshaft timing are shown in Figure 10. Refer to your Parts Catalog to identify part numbers for crankshaft components.

Coring Crankshaft (SR72)

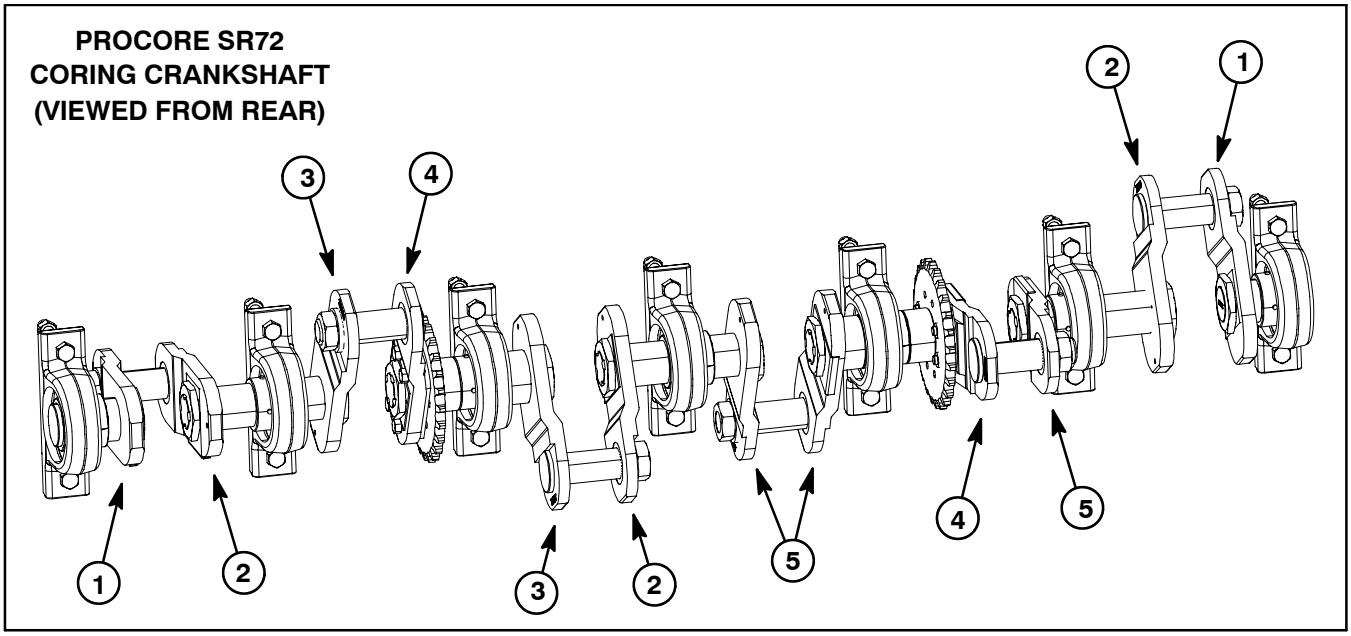

Figure 11

1. Crank arm (2 used)
2. Crank arm (3 used)
3. Crank arm (2 used)
4. Crank arm (2 used)
5. Crank arm (3 used)

The ProCore SR72 coring crankshaft uses five (5) different crank arms. For identification purposes, the crank arms and crankshaft timing are shown in Figure 11. Refer to your Parts Catalog to identify part numbers for crankshaft components.

Coring Crankshaft Bearing Housings

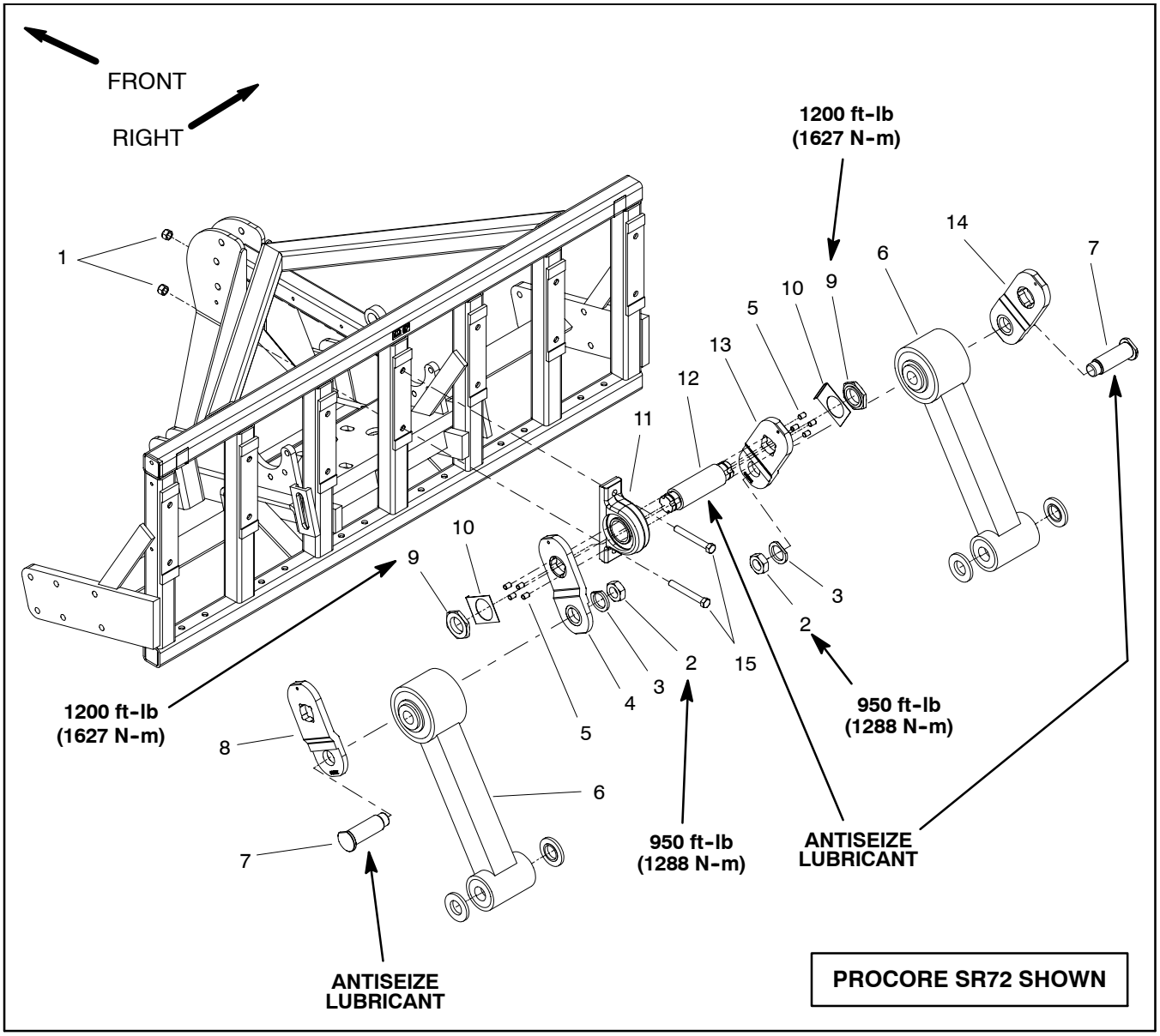

Figure 12

1. Lock nut
2. Hex nut
3. Clipped washer
4. Crank arm
5. Dowel pin bullets
6. Connecting rod assembly
7. Crank pin
8. Crank arm
9. Crank shaft nut
10. Locking plate
11. Bearing housing assembly
12. Crank shaft
13. Crank arm
14. Crank arm

IMPORTANT: Before disassembling the coring crankshaft, label location and orientation of all components that are to be removed. Correct component location and orientation are necessary for proper aerator operation.

NOTE: The crankshaft bearing housings for ProCore SR48 and SR72 series aerators are very similar. The ProCore SR72 is shown in Figure 12.

NOTE: Many of the coring crankshaft components depend on proper orientation. Crank pin (item 7) head position, crank arm location on the coring crankshaft, crank arm angle on the crank shaft (item 12) and bearing housing ball bearing (item 11) flange direction all need to be correctly placed for proper aerator operation. During bearing housing removal, carefully note position of components to allow proper assembly.

Removal (Fig. 12)

1. Position aerator on a firm, level surface. If aerator is attached to tractor, disengage PTO, apply tractor parking brake, stop engine and remove key from the ignition switch.

2. Unlatch, open and support back cover to allow access to coring crankshaft.

3. If bearing housing with drive chain attached is to be removed, remove coring head drive chain (see Coring Head Drive Disassembly in this section).

WARNING

As crankshaft components are removed from machine, the crankshaft will become out of balance and may rotate quickly, creating pinch points and potential for personal injury. Be cautious when disassembling the coring crankshaft.

4. Remove crank pins and connecting rods on both sides of bearing housing that is to be removed (see Connecting Rod Removal in this section).

5. Support bearing housing assembly to prevent it from falling. Remove two (2) cap screws and lock nuts that secure bearing housing assembly to coring head frame. Remove bearing housing assembly (with crank arms attached) from machine.

6. Disassemble bearing housing assembly:

IMPORTANT: The crank arms on either side of a bearing housing are different. Before bearing housing disassembly, make sure to note location and orientation of crank arms.

A. Note crank arm alignment with each other for assembly purposes. Incorrect alignment of crank arms will prevent smooth aerator operation and will lead to aerator damage. If desired, use a marker to make a **diagonal** line across the bearing housing and crank arms for assembly purposes.

B. Secure bearing housing assembly in a vise.

C. Bend locking plate (item 10) away from crank shaft nut (item 9) that secures one of the crank arms (item 4 or 13) to crank shaft (item 12). Remove the crank shaft nut.

D. Slide crank arm from crank shaft. Locate and retrieve four (4) dowel pin bullets (item 5) from crank arm.

E. If sprocket is attached to the removed crank arm, remove spacer from both sides of bearing housing (Fig. 13).

F. If sprocket is attached to removed crank arm, remove sprocket if necessary (Fig. 14).

G. Loosen set screws that secure bearings to crank shaft.

H. Slide crank shaft with attached crank arm from bearing housing.

I. If necessary, remove retaining rings and bearing from bearing housing (Fig. 15). Note orientation of bearing flange for assembly purposes. Discard bearing if removed from housing.

J. If removal of the second crank arm is necessary, make sure that alignment of crank arm to crank shaft is noted and then remove locking plate, crank shaft nut and second crank arm from crank shaft.

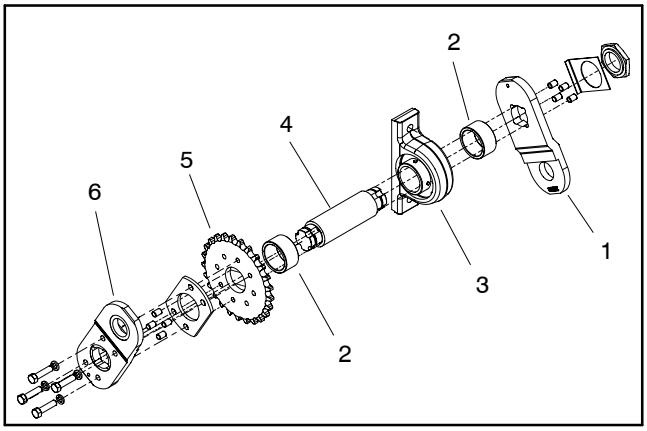

Figure 13

1. **Crank arm**
2. **Spacer**
3. **Bearing housing**
4. **Crank shaft**
5. **Sprocket**
6. **Crank arm**

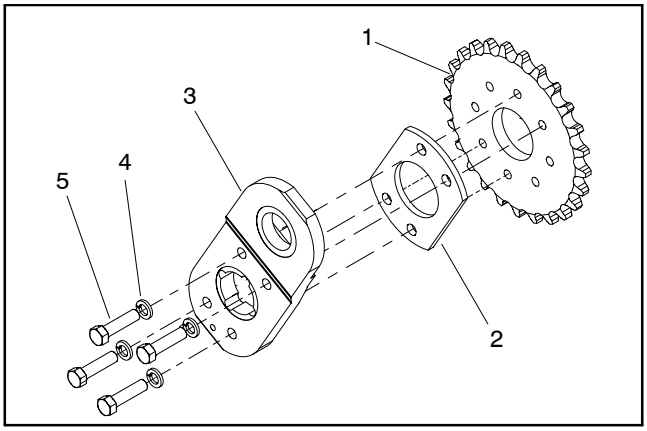

Figure 14

1. **Sprocket**
2. **Spacer (4 used)**
3. **Crank arm**
4. **Lock washer (4 used)**
5. **Cap screw (4 used)**

Installation (Fig. 12)

1. If bearing was removed from bearing housing, install new bearing into housing (Fig. 15):

   A. Install a retaining ring into one of the grooves in bearing housing. Make sure that retaining ring is properly seated in groove.

   B. Position bearing to bearing housing so bearing flange orientation is correct. Install new bearing into bearing housing by pressing on outer race of bearing.

   C. Install second retaining ring into bearing housing groove to secure bearing. Make sure that retaining ring is properly seated in housing groove.

2. Install components into bearing housing assembly:

   A. If a removed crank arm included a drive sprocket, install sprocket if it was removed (Fig. 14).

   B. If both crank arms were removed from crank shaft, use notes made during disassembly to properly orientate one of the crank arms (items 6 or 13) and slide onto crank shaft. Install locking plate and crank shaft nut onto crank shaft threads to secure crank arm to crank shaft. Make sure that nut shoulder fits into hole in locking plate.

   C. Apply antiseize lubricant liberally to crank shaft (item 12). Slide crank shaft with attached crank arm into bearing housing. Do not tighten bearing set screws (item 15) at this time.

   D. If sprocket is attached to either of the removed crank arms, install spacer to both sides of bearing housing (Fig. 13).

   E. Using notes made during disassembly, properly orientate second crank arm (items 6 or 13) and slide onto crank shaft.

   F. Place four (4) dowel pin bullets (item 5) to each crank arm.

   G. Install locking plate and crank shaft nut onto crank shaft threads to secure crank arm to crank shaft. Make sure that shoulder on nut fits into hole in locking plate.

   H. Secure bearing housing assembly in a vise and fully tighten crank shaft nuts to secure assembly. Torque nuts to **1200 ft-lb (1627 N-m)**.

3. Position bearing housing assembly to aerator frame. Install two (2) cap screws and lock nuts to secure bearing housing assembly to coring head frame.

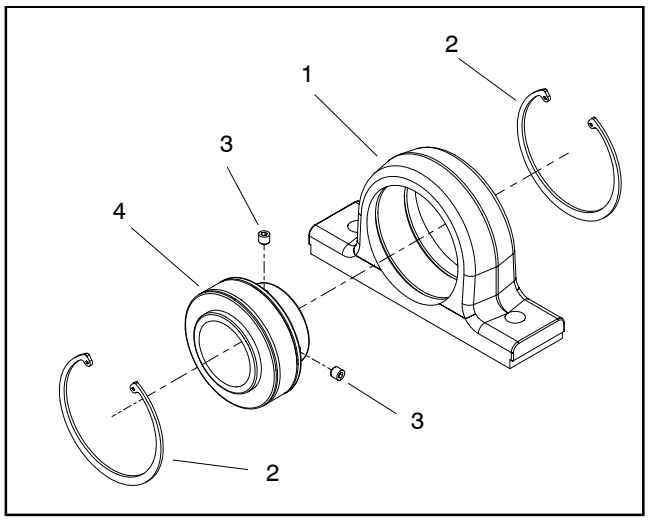

Figure 15

1. **Bearing housing**
2. **Retaining ring**
3. **Set screw**
4. **Ball bearing**

4. Install crank pins and connecting rods on both sides of bearing housing (see Connecting Rod Installation in this section).

5. Rotate coring crankshaft to allow access to nuts (items 2 and 9) that secure crank arms and connecting rods on both sides of crankshaft bearing housing.

6. Insert block of wood between aerator frame and connecting rod to prevent the crankshaft from turning. Torque hex nuts (item 2) that secure crank pins to **950 ft-lb (1288 N-m)**. Torque crank shaft nuts (item 9) to **1200 ft-lb (1627 N-m)**.

7. Tighten set screws to secure ball bearing flange to crankshaft.

8. After assembly, rotate coring crankshaft by hand to make sure that no binding occurs.

IMPORTANT: When installing coring head drive chains, make sure that one of the chains is installed and properly tensioned before installing second chain.

9. If removed, install coring head drive chain (see Coring Head Drive Assembly in this section). Make sure that chain is properly tensioned.

10. Lower and secure back cover.

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Coring Head Drive Chain

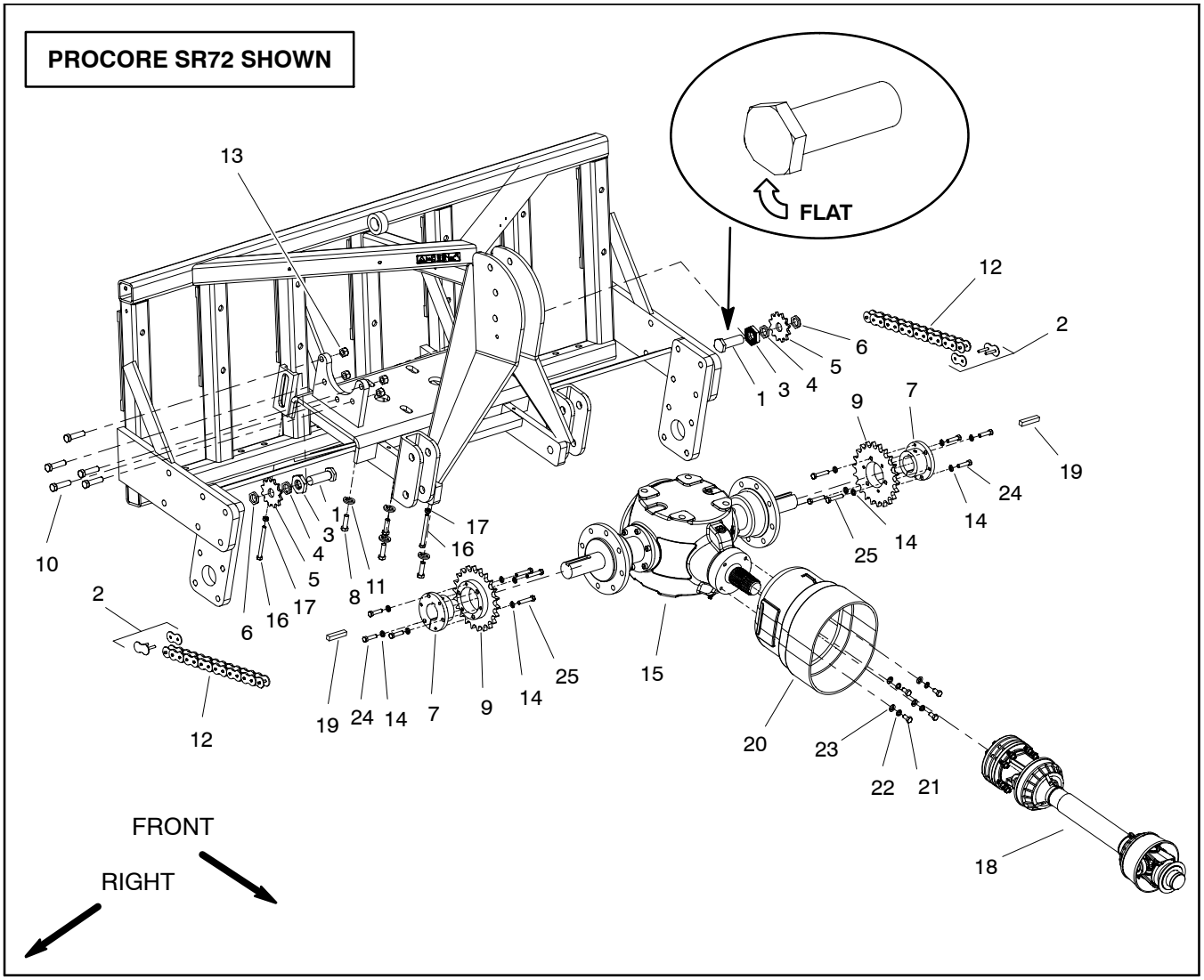

Figure 16

1. Idler shaft
2. Master link assembly
3. Jam nut (grooved)
4. Jam nut
5. Idler sprocket
6. Lock nut
7. Sprocket hub (2 used)
8. Cap screw (4 used)
9. Sprocket (2 used)
10. Saddle bolt (10 used)
11. Lock washer (4 used)
12. Drive chain (2 used)
13. Lock nut (10 used)
14. Lock washer
15. Gearbox assembly
16. Bolt
17. Hex nut
18. PTO driveshaft
19. Square key
20. Driveshaft shield
21. Cap screw (4 used)
22. Lock washer (4 used)
23. Flat washer (4 used)
24. Cap screw (3 used per hub)
25. Cap screw (3 used per sprocket)

NOTE: The drive chain assemblies for ProCore SR48 and SR72 series aerators are very similar. The ProCore SR72 is shown in Figure 16.

Disassembly (Fig. 16)

1. Position aerator on a firm, level surface. If aerator is attached to tractor, disengage PTO, apply tractor parking brake, stop engine and remove key from the ignition switch.

2. Raise and support rear hood.

3. Loosen jam nut (item 3), hex nut (item 17) and bolt (item 16) to loosen idler tension on drive chain.

4. Rotate coring crankshaft until drive chain master link is located at gearbox sprocket. Note direction of closed end of master link clip for assembly purposes. Remove master link from drive chain. Locate and remove master link O−rings.

5. Remove drive chain from gearbox, coring crankshaft and idler sprockets (Fig. 17).

6. If necessary, remove sprocket(s) from gearbox shaft (see Coring Head Drive Sprockets Disassembly in this section).

7. If sprocket removal from coring crankshaft is necessary, remove coring crankshaft bearing housing that includes sprocket and remove sprocket from crank arm (see Coring Crankshaft Bearing Housing Removal in this section).

8. If necessary, remove idler assembly using Figure 16 as a guide.

Assembly (Fig. 16)

1. If coring crankshaft sprocket was removed, secure sprocket to crank arm and install coring crankshaft bearing housing (see Coring Crankshaft Bearing Housing Installation in this section).

2. If sprockets were removed from gearbox shaft, install sprockets to gearbox shaft (see Coring Head Drive Sprockets Assembly in this section).

3. If idler assembly parts were removed from frame, install idler components using Figure 16 as a guide. Make sure that flat on head of idler shaft (item 1) is positioned toward location of adjustment bolt (item 16). Do not fully tighten grooved jam nut (item 3) at this time.

4. Using a suitable straight edge, check that alignment between gearbox, coring crankshaft and idler sprockets is correct. If needed, readjust sprocket location on gearbox shaft to align sprockets.

IMPORTANT: When installing drive chains, install and properly tension one of the drive chains. Then, install and tension the second chain.

5. If both drive chains were removed, install first drive chain:

A. Position drive chain to gearbox sprocket, pull upper run of chain tight and align with coring crankshaft sprocket teeth. If necessary, slightly rotate coring crankshaft so that chain remains tight when aligned with sprocket teeth. Route chain over idler sprocket and back to gearbox sprocket (Fig. 17). Do not allow upper run of chain to have excessive slack.

B. Apply grease to master link O-rings. Place two (2) O-rings on master link pins and install into ends of drive chain. Place final two (2) O-rings on master link pins and install side plate.

C. Install master link clip so that the closed end is facing the direction of chain rotation.

IMPORTANT: To prevent gearbox damage, do not overtighten drive chains. Drive chains should have 1/2" (12.7 mm) total deflection when properly adjusted.

D. Adjust idler sprocket location with bolt (item 16) so that chain has 1/2" (12.7 mm) total deflection at mid-span between sprockets. Make sure that jam nut (item 3) and bolt (item 16) are fully tightened after chain adjustment is completed.

6. Block crankshaft to prevent it from rotating. Install and adjust second drive chain using procedure listed in step 5 above.

7. After assembly, rotate coring crankshaft by hand to make sure that no binding occurs.

8. Lower and secure rear hood.

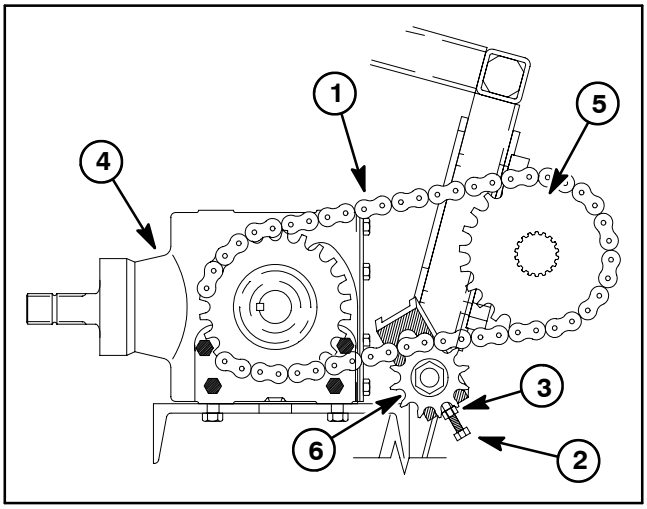

Figure 17

1. **Drive chain**
2. **Bolt**
3. **Hex nut**
4. **Gearbox**
5. **Crankshaft sprocket**
6. **Idler sprocket**

Coring Head Drive Sprockets

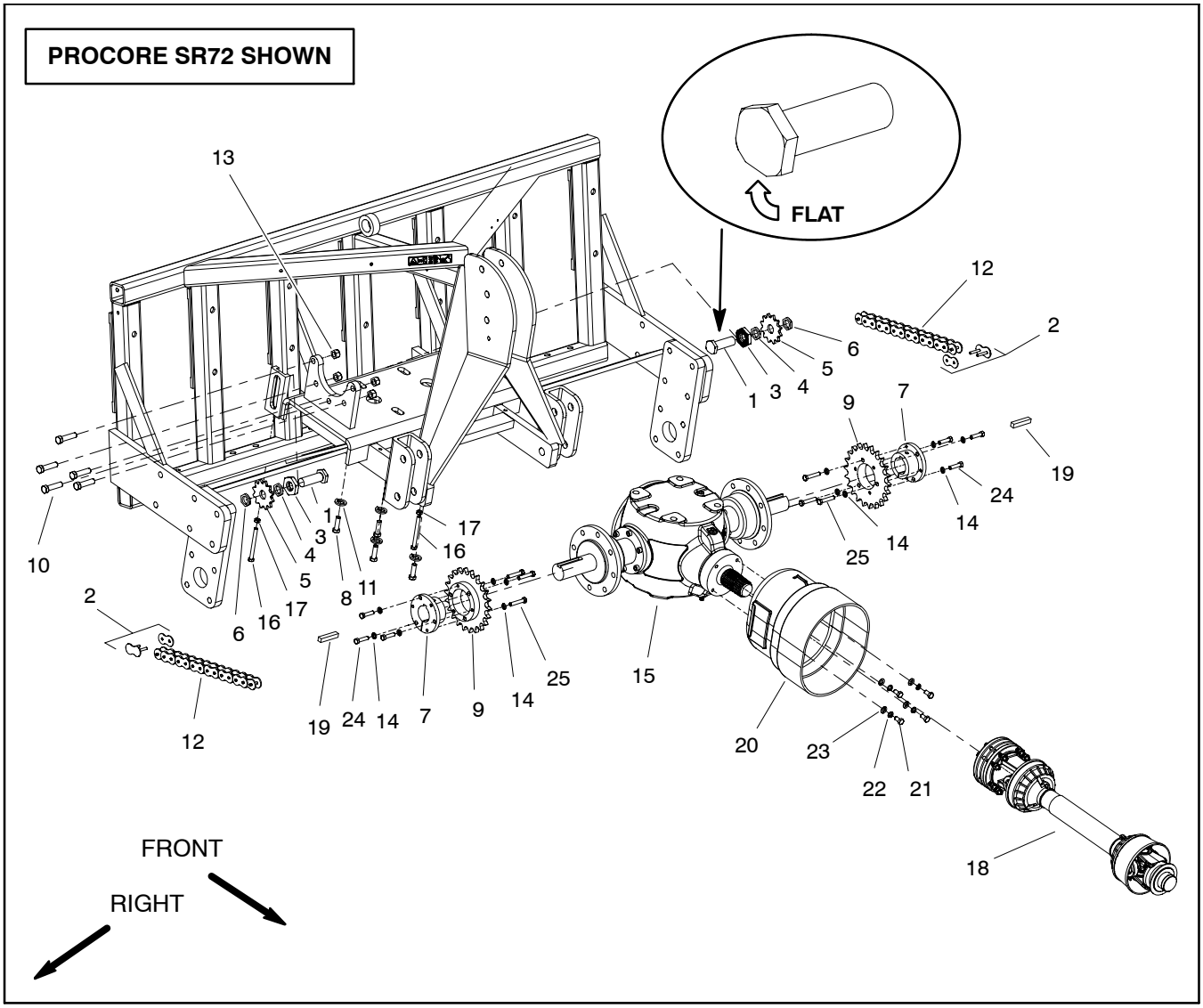

Figure 18

1. **Idler shaft**
2. **Master link assembly (2 used)**
3. **Jam nut (grooved)**
4. **Jam nut**
5. **Idler sprocket**
6. **Lock nut**
7. **Sprocket hub (2 used)**
8. **Cap screw (4 used)**
9. **Sprocket (2 used)**
10. **Saddle bolt (10 used)**
11. **Lock washer (4 used)**
12. **Drive chain (2 used)**
13. **Lock nut (10 used)**
14. **Lock washer**
15. **Gearbox assembly**
16. **Bolt**
17. **Hex nut**
18. **PTO driveshaft**
19. **Square key**
20. **Driveshaft shield**
21. **Cap screw (4 used)**
22. **Lock washer (4 used)**
23. **Flat washer (4 used)**
24. **Cap screw (3 used per hub)**
25. **Cap screw (3 used per sprocket)**

NOTE: The drive sprocket assemblies for ProCore SR48 and SR72 series aerators are very similar. The ProCore SR72 is shown in Figure 18.

Disassembly (Fig. 18)

1. Position aerator on a firm, level surface. If aerator is attached to tractor, disengage PTO, apply tractor parking brake, stop engine and remove key from the ignition switch.

2. Raise and support rear hood.

3. Remove front screens (see Covers Removal in the Service and Repairs section of Chapter 3 – Chassis).

4. Remove drive chains (see Coring Head Drive Chain Disassembly in this section).

5. Remove sprocket(s) from gearbox shaft:

   A. Measure distance from end of gearbox output shaft to location of sprocket hub for assembly purposes. Record measurement.

   B. Remove six (6) cap screws (items 24 and 25) and lock washers (item 14) that secure sprocket to sprocket hub.

   IMPORTANT: Excessive or unequal pressure on the cap screws can break the sprocket hub flange. When removing sprocket from hub, tighten screws progressively and evenly.

   C. Insert three (3) cap screws into threaded removal holes of the sprocket hub. Tighten screws progressively and evenly until the sprocket is loose on the hub. Position sprocket away from hub.

   D. Remove set screw that secures sprocket hub to gearbox shaft.

   E. Remove hub, sprocket and square key from gearbox shaft.

6. If sprocket removal from coring crankshaft is necessary, remove coring crankshaft bearing housing that includes sprocket and remove sprocket from crank arm (see Coring Crankshaft Bearing Housing Removal in this section).

Assembly (Fig. 18)

1. If coring crankshaft sprocket was removed, secure sprocket to crank arm and install coring crankshaft bearing housing (see Coring Crankshaft Bearing Housing Installation in this section).

2. Install sprockets to gearbox shaft:

   A. Make sure that tapered surfaces of sprocket and sprocket hub are thoroughly clean (no oil, grease, dirt, rust, etc.).

   B. Position square key in gearbox shaft slot. Apply antiseize lubricant to bore of sprocket hub.

   C. Slide sprocket and hub onto gearbox shaft making sure that tapered surfaces of sprocket and hub align.

   D. Position hub location from end of gearbox shaft as measured before removal. Secure hub to gearbox shaft with set screw.

   IMPORTANT: When securing sprocket and sprocket hub, tighten cap screws in three (3) equal steps and in a circular pattern to prevent hub flange damage.

   E. Align threaded holes of sprocket with non-threaded holes of sprocket hub and install three (3) cap screws (item 24) with lock washers (item 14). Tighten cap screws in three (3) equal steps and in a circular pattern to secure sprocket and sprocket hub.

   F. Install and tighten three cap screws (item 25) with lock washers (item 14). Tighten cap screws in three (3) equal steps and in a circular pattern

3. Using a suitable straight edge, check that alignment between gearbox, coring crankshaft and idler sprockets is correct. If needed, readjust sprocket location on gearbox shaft to align sprockets.

4. Install and tension drive chains (see Coring Head Drive Chain Assembly in this section).

5. After assembly, rotate coring crankshaft by hand to make sure that no binding occurs.

6. Install front screens to machine (see Covers Installation in the Service and Repairs section of Chapter 3 – Chassis).

7. Lower and secure rear hood.

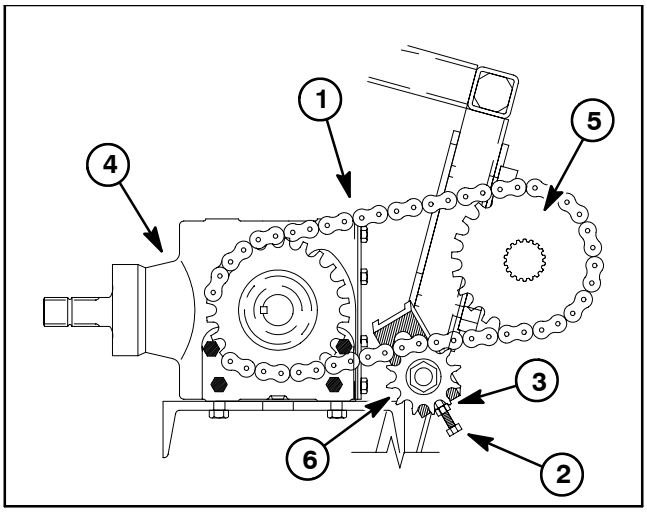

Figure 19

1. Drive chain
2. Bolt
3. Hex nut
4. Gearbox
5. Crankshaft sprocket
6. Idler sprocket

Gearbox

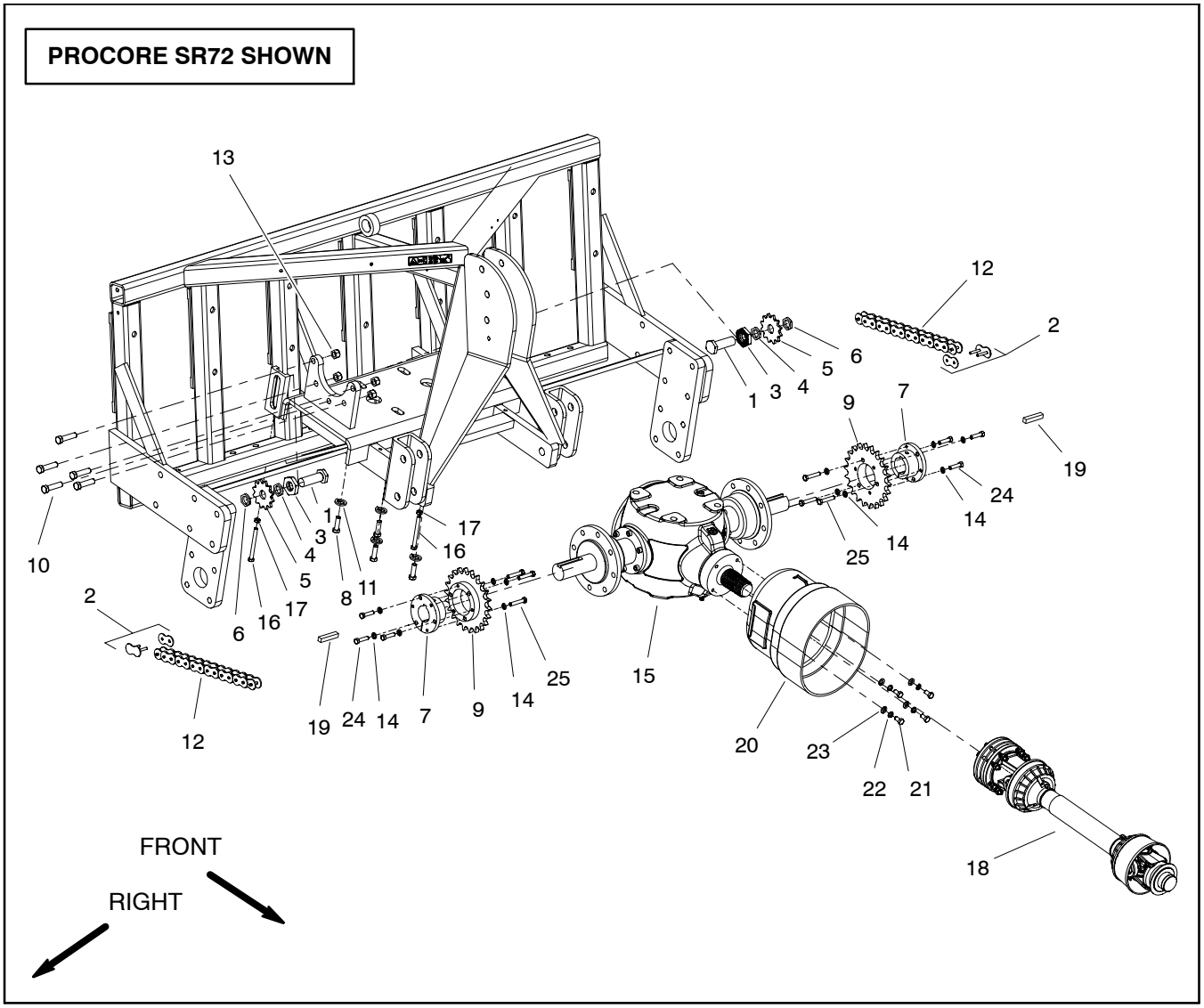

Figure 20

1. **Idler shaft**
2. **Master link assembly (2 used)**
3. **Jam nut (grooved)**
4. **Jam nut**
5. **Idler sprocket**
6. **Lock nut**
7. **Sprocket hub (2 used)**
8. **Cap screw (4 used)**
9. **Sprocket (2 used)**
10. **Saddle bolt (10 used)**
11. **Lock washer (4 used)**
12. **Drive chain (2 used)**
13. **Lock nut (10 used)**
14. **Lock washer**
15. **Gearbox assembly**
16. **Bolt**
17. **Hex nut**
18. **PTO driveshaft**
19. **Square key**
20. **Driveshaft shield**
21. **Cap screw (4 used)**
22. **Lock washer (4 used)**
23. **Flat washer (4 used)**
24. **Cap screw (3 used per hub)**
25. **Cap screw (3 used per sprocket)**

NOTE: Gearbox installation for ProCore SR48 and SR72 series aerators is very similar. The ProCore SR72 is shown in Figure 20.

Gearbox Removal (Fig. 20)

1. Position aerator on a firm, level surface. If aerator is attached to tractor, disengage PTO, apply tractor parking brake, stop engine and remove key from the ignition switch.

2. Remove screens from aerator frame (see Covers Removal in the Service and Repairs section of Chapter 3 – Chassis).

3. Drain lubricant from gearbox.

4. Disconnect PTO driveshaft from gearbox input shaft (see PTO Driveshaft Removal in the Service and Repairs section of Chapter 3 – Chassis).

5. Remove four (4) cap screws, lock washers and flat washers that secure driveshaft shield (item 20) to gearbox. Remove shield.

6. Remove drive chains from gearbox sprockets (see Coring Head Drive Chain Disassembly in this section).

7. Remove drive sprocket and sprocket hub from both gearbox output shafts (see Coring Head Drive Sprockets Disassembly in this section).

8. Remove ten (10) saddle bolts (item 10) and lock nuts (item 13) that secure gearbox flanges to frame.

9. Remove four (4) cap screws and lock washers that secure gearbox to aerator frame.

CAUTION

To prevent personal injury, make sure that gearbox is supported as it is removed from the machine. Refer to Specifications in this chapter for approximate gearbox weight.

10. Carefully remove gearbox from machine.

NOTE: For gearbox disassembly and assembly information, refer to the Service and Repairs section of Chapter 7 – Gearbox Service.

Gearbox Installation (Fig. 20)

IMPORTANT: If a gearbox is incorrectly assembled or installed (e.g. output shaft installed into gearbox in reverse direction or gearbox placed on frame upside down), there is a possibility that gearbox output shaft rotation will be incorrect for proper aerator operation. After placing the gearbox on the frame, make sure that rotation of the input shaft results in the correct output shaft rotation direction. Figure 21 shows correct shaft rotation direction for the gearbox shafts. If rotation is incorrect, check gearbox assembly and installation before proceeding with installation procedure.

CAUTION

To prevent personal injury, make sure that gearbox is supported as it is installed to the machine. Refer to Specifications in this chapter for approximate gearbox weight.

1. Position gearbox to aerator frame. Secure gearbox to frame with four (4) cap screws and lock washers.

2. Install and tighten ten (10) saddle bolts (item 10) and lock nuts (item 13) to frame and gearbox flanges.

3. Install sprocket and sprocket hub to both gearbox output shafts (see Coring Head Drive Sprockets Assembly in this section).

4. Install both drive chains (see Coring Head Drive Chain Assembly in this section). Make sure that drive chains are properly adjusted after assembly.

5. Position driveshaft shield (item 20) to gearbox and secure with four (4) cap screws, lock washers and flat washers.

6. Connect PTO driveshaft to gearbox input shaft (see PTO Driveshaft Installation in the Service and Repairs section of Chapter 3 – Chassis).

7. Fill gearbox with proper lubricant (see Operator's Manual).

8. After assembly, rotate coring crankshaft by hand to make sure that no binding occurs.

9. Install screens to aerator (see Covers Installation in the Service and Repairs section of Chapter 3 – Chassis).

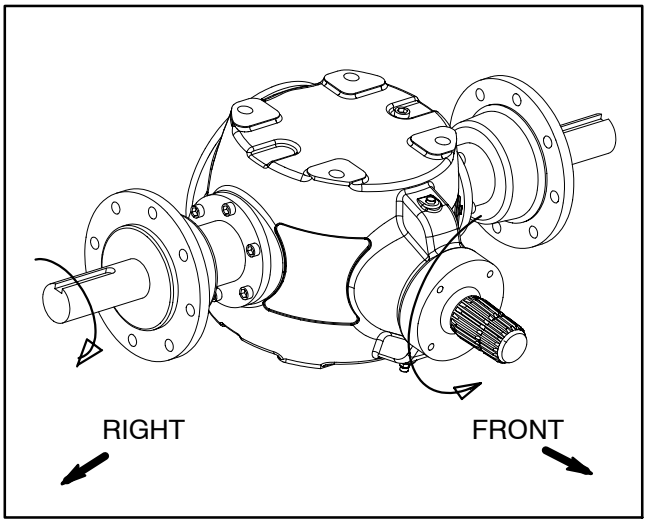

Figure 21

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Chapter 6

Coring Head (SR75)

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Specifications

Item	Description
ProCore SR75	
Aerating Width	78 inches (1.98 meters)
Number of Connecting Rods	6
Number of Rollers	1
Depth Adjustment	Hydraulic Top Link
Gearbox Lubricant	SAE 80W-90 gear lube
Gearbox Lubricant Capacity	4 US quarts (3.8 liters)
Gearbox Weight	220 lbs (100 kg)

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Coring Head

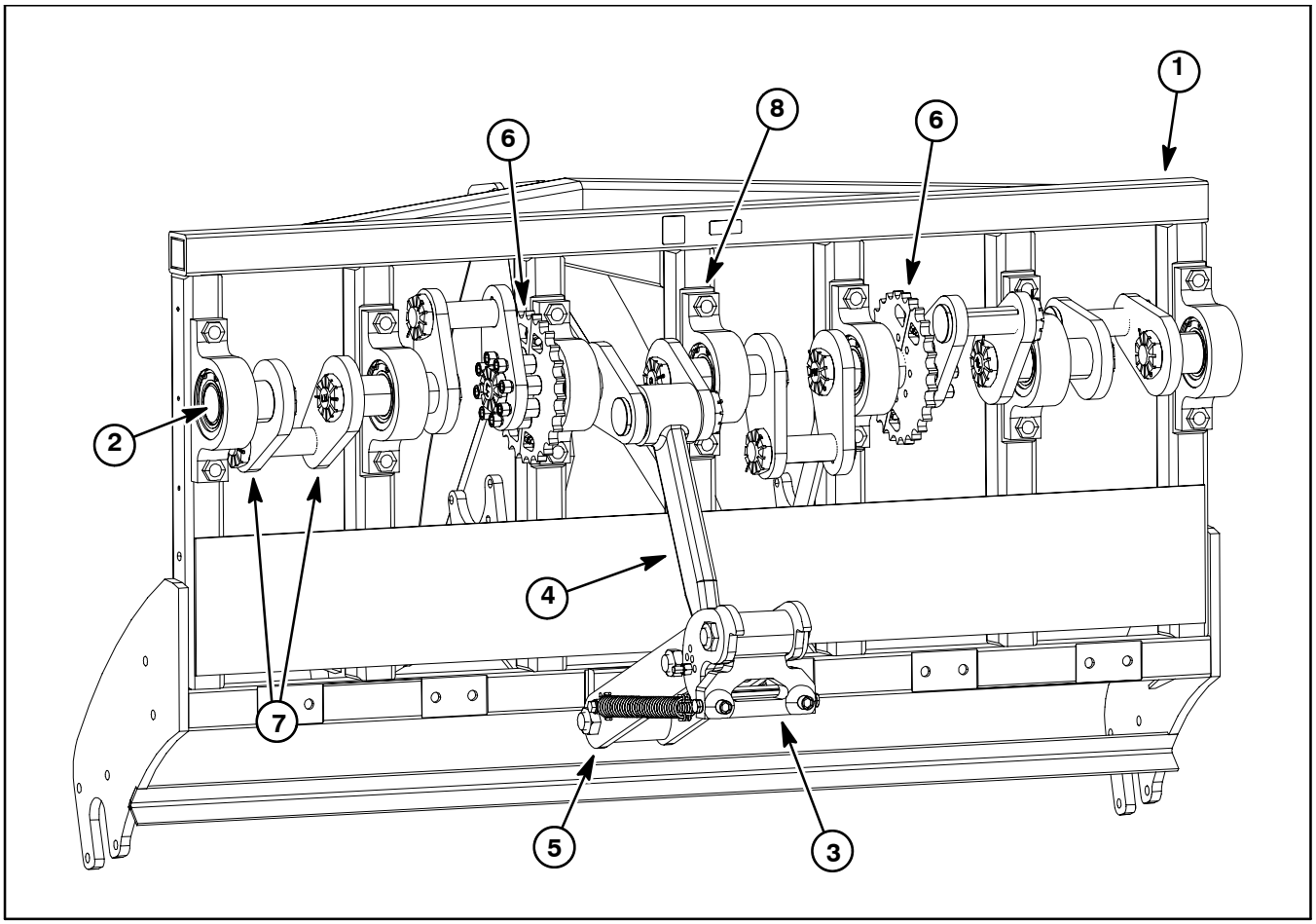

Figure 1

1. **Aerator frame**
2. **Coring crankshaft assembly**
3. **Tine holder**
4. **Connecting rod**
5. **Linkage arm assembly**
6. **Drive chain sprocket**
7. **Crank arm**
8. **Bearing housing assembly**

The coring head of a ProCore SR75 deep tine aerator consists of the aerator frame, a coring crankshaft assembly, tine holders and aerating tines. The rotating crankshaft assembly operates six (6) connecting rods with linkage arm assemblies to provide effective tine motion for deep turf aeration. The aerator frame pivots on a single roller to allow aerating depth control.

Drive for the coring head is provided by the towing tractor PTO output shaft. A gearbox on the ProCore aerator is rotated by a driveshaft connected to the tractor PTO shaft. The aerator gearbox provides rotation for the coring head crankshaft assembly with two (2) drive chains. The drive chains are each tensioned by an adjustable idler sprocket.

The coring crankshaft is composed of multiple crankarms, bearings, bearing housings and crank pins. The crankshaft assembly is designed and assembled to ensure minimal vibration during aerator operation.

A variety of tines and tine heads are available for use on ProCore SR Series aerators. Refer to the Operator's Manual for available options.

Coring Head Adjustments

See Operator's Manual for adjustment procedures for the coring head on your ProCore SR series aerator.

CAUTION

Never work on the aerator with the tow tractor PTO engaged or engine running. Always disengage the PTO, stop tractor engine, remove key from the ignition switch and wait for all machine movement to stop before performing any service to aerator components.

Special Tools

Order special tools from your Toro Distributor.

Crankshaft Nut Wrench

This three (3) foot long wrench can be used to loosen and remove the fasteners that secure coring head crankshaft crank arms and connecting rods.

Toro Part Number: **SG885300**

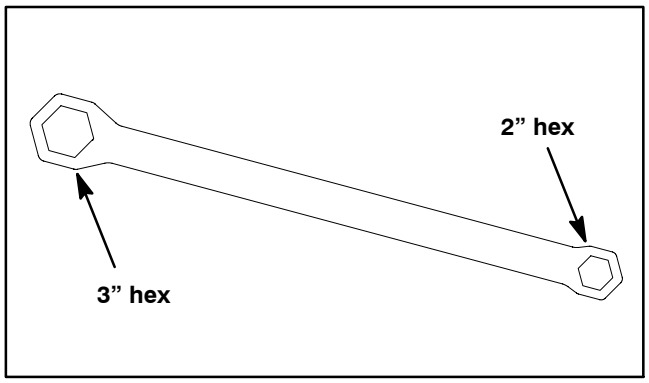

Figure 2

Bullet Tools

Use to protect threads of crankshaft components during assembly of crankshaft, connecting rods and linkage arms. The bullet tool should be installed onto the threads of the crankpin or linkage arm fastener to prevent thread damage when component is installed.

NOTE: On ProCore SR75 aerators, bullet tool SG255001 is used for the wrist pins that secure the linkage arms.

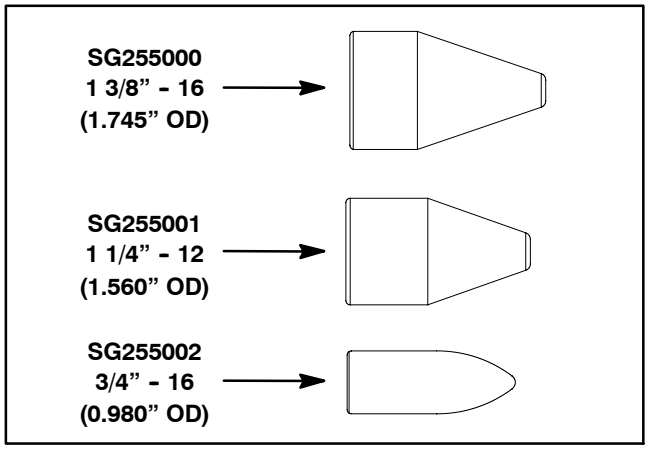

Figure 3

Torque Multiplier

Use in conjunction with an appropriate torque wrench to install and properly torque the fasteners that secure coring head crankshaft crank arms and connecting rods. Obtain this tool locally.

Figure 4

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Linkage Arm Assemblies

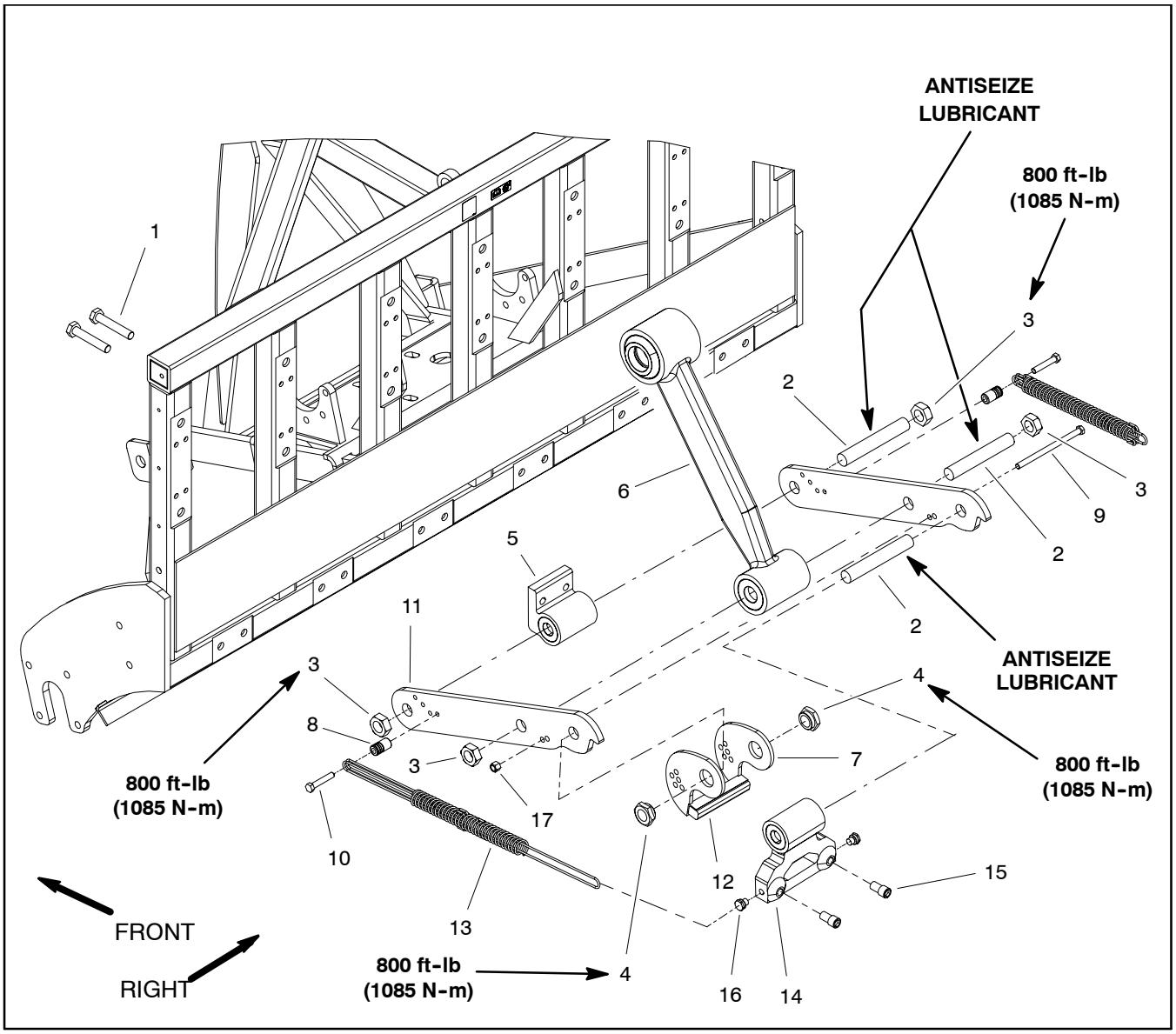

Figure 5

1. Cap screw
2. Wrist pin
3. Lock nut
4. Boss nut
5. Hinge assembly
6. Connecting rod assembly
7. Camber bracket
8. Rear spring post
9. Cap screw
10. Cap screw
11. Linkage arm
12. Bumper pad
13. Spring assembly
14. Tine head assembly
15. Tine head bolt
16. Front spring holder
17. Lock nut

Disassembly (Fig. 5)

1. Position aerator on a firm, level surface. If aerator is attached to tractor, disengage PTO, apply tractor parking brake, stop engine and remove key from the ignition switch.

CAUTION

Be careful when removing the spring assembly. The spring is under load and may cause personal injury during removal.

2. Remove both spring assemblies from rear spring post (item 8) and front spring holder (item 16).

3. Remove linkage arm components as needed using Figure 5 as a guide.

4. If necessary, disassemble tine head assembly using Figure 6 as a guide.

5. If necessary, disassemble hinge assembly using Figure 7 as a guide.

6. Discard all removed bearings.

Assembly (Fig. 5)

1. If tine head (Fig. 5) or hinge assemblies (Fig. 6) were disassembled:

   A. Install one (1) retaining ring into groove in bore. Make sure that retaining ring is properly seated in groove.

   B. Press a new bearing into the component bore until the bearing contacts installed retaining ring.

   C. Press remaining new bearings into bore so that they contact previously installed bearing.

   D. After all bearings have been installed, install second retaining ring into groove in component bore. Make sure that retaining ring is properly seated in groove.

2. Apply antiseize lubricant to wrist pin (item 2).

NOTE: When installing wrist pins (item 2), use bullet tool SG255001 (see Special Tools in this chapter) to prevent wrist pin thread damage.

3. Assemble linkage arm components using Figure 5 as a guide.

   A. Torque lock nuts (item 3) and boss nuts (item 4) to **800 ft-lb (1085 N-m)**.

4. Make sure that spring wires are not broken or crossed (Fig. 8). Install both spring assemblies to rear spring post (item 8) and front spring holder (item 16).

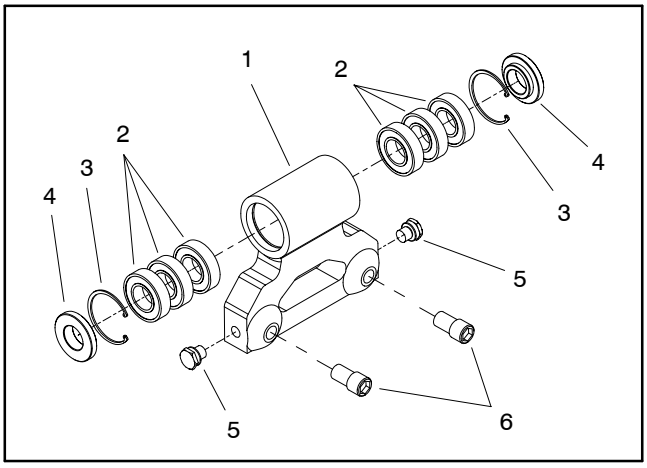

Figure 6

1. **Tine head housing**
2. **Bearing**
3. **Retaining ring**
4. **Outer bushing**
5. **Front spring holder**
6. **Tine head bolt**

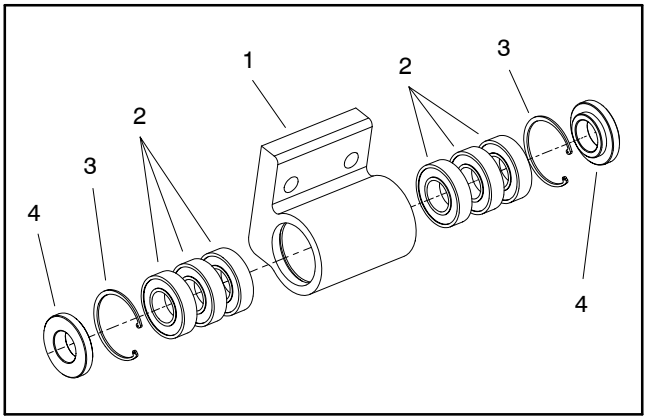

Figure 7

1. **Hinge housing**
2. **Bearing**
3. **Retaining ring**
4. **Outer bushing**

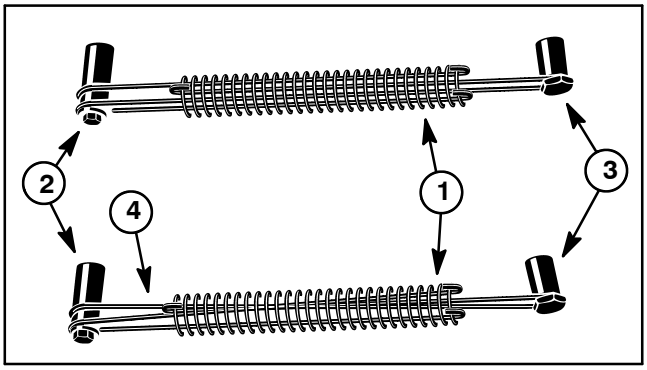

Figure 8

1. **Spring assembly**
2. **Rear spring post**
3. **Front spring holder**
4. **Crossed spring wires**

Connecting Rods

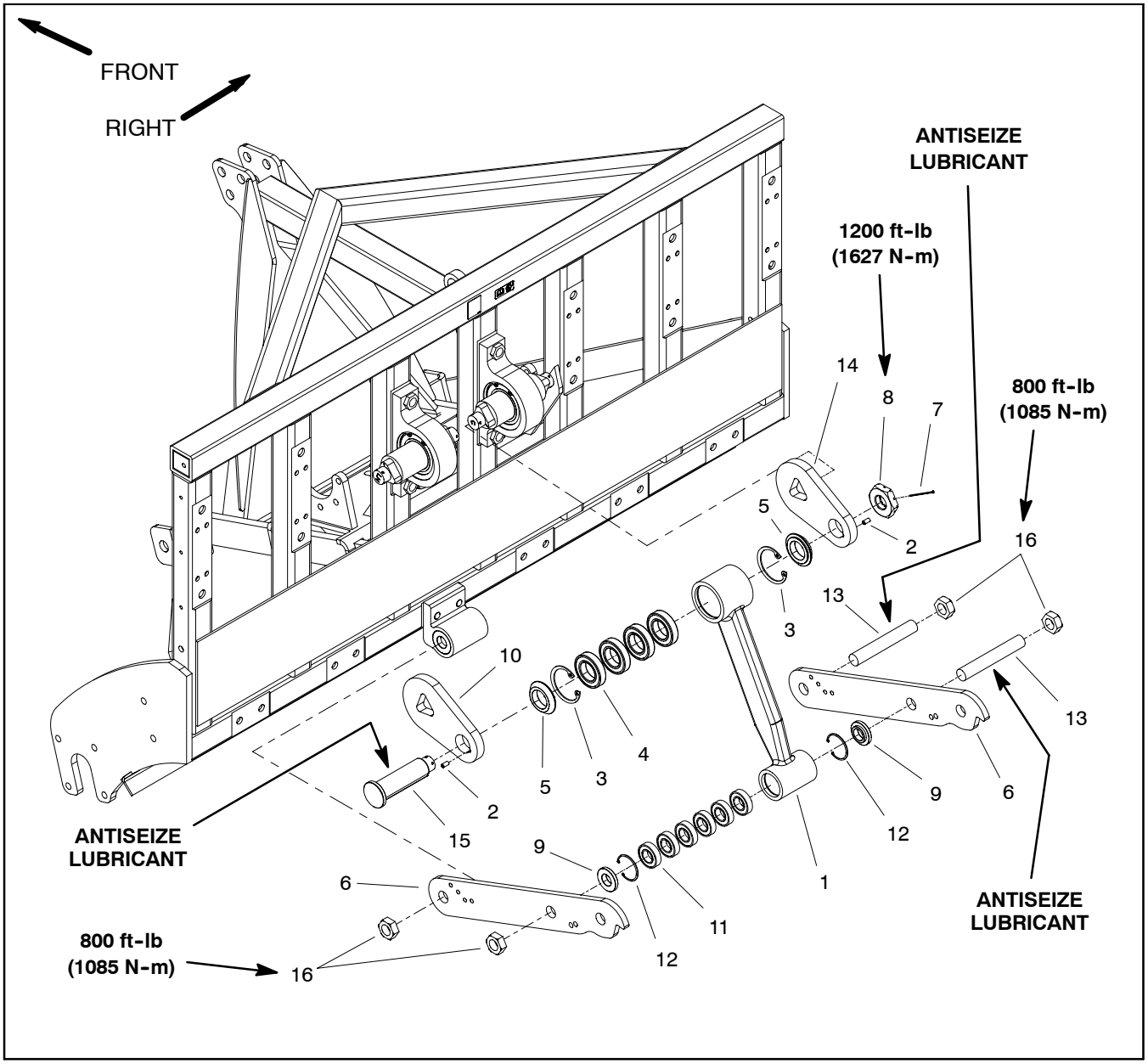

Figure 9

1. Connecting rod
2. Dowel pin
3. Retaining ring (2 per connecting rod)
4. Bearing (4 per connecting rod)
5. Outer bushing (2 per connecting rod)
6. Linkage arm
7. Cotter pin
8. Crank nut
9. Outer bushing (2 per connecting rod)
10. Crank arm
11. Bearing (6 per connecting rod)
12. Retaining ring (2 per connecting rod)
13. Wrist pin
14. Crank arm
15. Crank pin
16. Lock nut

IMPORTANT: Before disassembling the coring crankshaft, label location and orientation of components that are to be removed. Correct component location and orientation are necessary for proper aerator operation.

Removal (Fig. 9)

1. Position aerator on a firm, level surface. If aerator is attached to tractor, disengage PTO, apply tractor parking brake, stop engine and remove key from the ignition switch.

2. Unlatch, open and support rear hood to allow access to coring crankshaft.

3. Rotate coring crankshaft to allow access to crank pin (item 15) and crank nut (item 8) for connecting rod to be removed. Remove cotter pin (item 7) from crank nut.

IMPORTANT: When loosening crank nut (item 8) DO NOT use a pipe wrench or other adjustable wrench. Damage to the crank nut (item 8) and crank pin (item 15) may occur if adjustable wrench is used.

4. Insert block of wood between aerator frame and connecting rod to prevent the crankshaft from turning. Using crank shaft nut wrench (see Special Tools), loosen, but do not remove, crank nut (item 8).

5. Support connecting rod that is to be removed to prevent it from falling.

WARNING

As crankshaft components are removed from machine, the crankshaft will become out of balance and may rotate quickly, creating pinch points and potential for personal injury. Be cautious when disassembling the coring crankshaft.

IMPORTANT: When removing crank pin (item 15), note head orientation for proper assembly.

6. For connecting rod that is to be removed, remove crank nut (item 8) and crank pin (item 15) that secure upper end of connecting rod to crank arm. Locate and retrieve dowel pin (item 2) from each crank arm.

7. For connecting rod that is to be removed, remove lock nut (item 16) and wrist pin (item 13) that secure lower end of connecting rod to coring linkage arms.

8. Remove connecting rod assembly from aerator.

9. As needed, remove outer bushings, retaining rings and ball bearings from upper and lower bores of connecting rod. Discard all removed bearings.

Installation (Fig. 9)

1. If bearings were removed from connecting rod bore(s), install new bearings into connecting rod.

   A. Install one (1) retaining ring into groove in bore of rod. Make sure that retaining ring is properly seated in groove.

   B. Press a new bearing into the connecting rod bore until the bearing contacts the installed retaining ring.

   C. Press remaining new bearings into bore so that they contact previously installed bearing.

   D. After all bearings have been installed, install second retaining ring into groove in connecting rod bore. Make sure that retaining ring is properly seated in groove.

2. Apply antiseize lubricant to crank pin (item 15) and wrist pin (item 13).

3. Place outer bushings (item 9) to small (lower) end of connecting rod. Position lower end of connecting rod assembly to coring linkage arms.

NOTE: When installing wrist pin (item 13), use bullet tool SG255001 (see Special Tools in this chapter) to prevent wrist pin thread damage.

4. Slide wrist pin into linkage arms and connecting rod bearings.

5. Place outer bushings (item 5) to large (upper) end of connecting rod. Position upper end of connecting rod assembly to crank arms. Place dowel pins (item 2) in crank arm bores. Align crank pin (item 15) to dowel pins and insert crank pin through crank arms and upper connecting rod bearings.

6. Thread crank nut (item 8) onto crank pin and lock nut (item 16) to wrist pin.

IMPORTANT: When tightening crank nut (item 8) DO NOT use a pipe wrench or other adjustable wrench. Damage to the crank nut (item 8) and crank pin (item 15) may occur if adjustable wrench is used.

7. Properly torque connecting rod fasteners:

   A. Torque lock nuts (item 16) that secure wrist pin to **800 ft-lb (1085 N-m)**.

   B. Torque crank nut (item 8) on crank pin to **1200 ft-lb (1627 N-m)**.

8. After assembly, rotate coring crankshaft by hand to make sure that no binding occurs.

9. Install cotter pin (item 7).

10. Lower and secure rear hood.

Coring Crankshaft

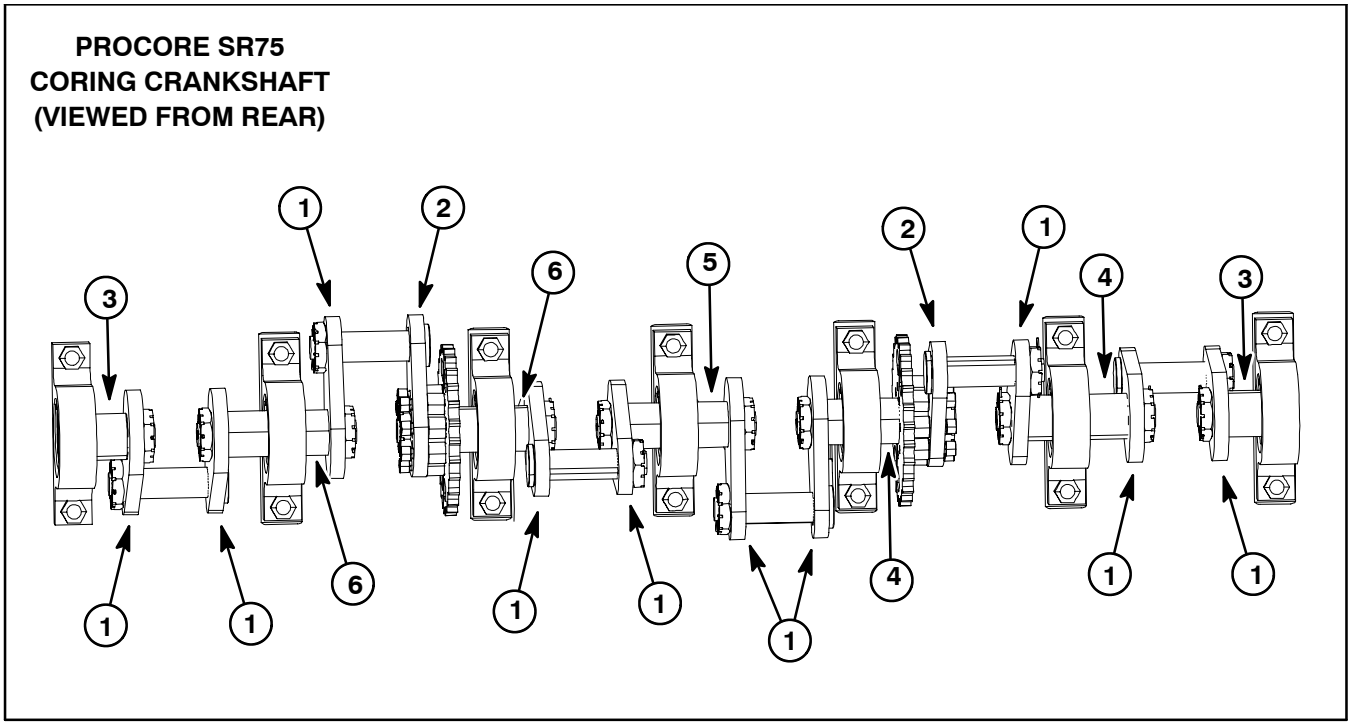

Figure 10

1. **Crank arm (10 used)**
2. **Crank arm (2 used)**
3. **End crank shaft (2 used)**
4. **RH crank shaft (2 used)**
5. **Center crank shaft**
6. **LH crank shaft (2 used)**

The ProCore SR75 coring crankshaft uses two (2) different crank arms and four (4) different crank shafts. For identification purposes, the crank arms, crank shafts and crankshaft timing are shown in Figure 10. Refer to your Parts Catalog to identify part numbers for crankshaft components.

NOTE: The RH, LH and center crank shafts can be identified by engravings on one end of the crank shaft. When assembled, the engraving should be orientated toward the left side of the machine when viewed from the rear.

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Coring Crankshaft Bearing Housings

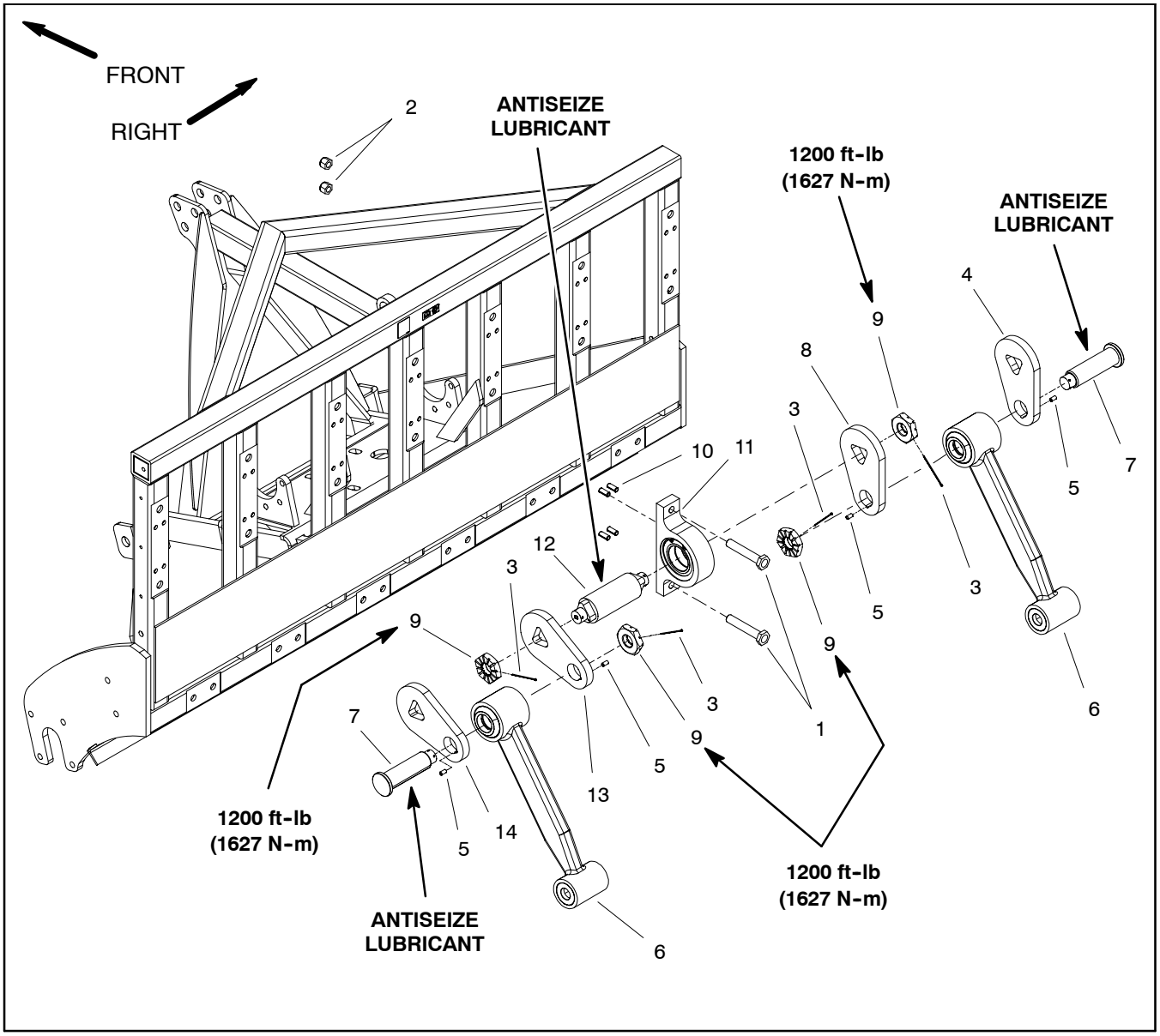

Figure 11

1. Cap screw (2 per bearing housing)
2. Lock nut (2 per bearing housing)
3. Cotter pin
4. Crank arm
5. Dowel pin
6. Connecting rod assembly
7. Crank pin
8. Crank arm
9. Crank nut
10. Spring pin (4 per bearing housing)
11. Bearing housing assembly
12. Crank shaft
13. Crank arm
14. Crank arm

IMPORTANT: Before disassembling the coring crankshaft, label location and orientation of all components that are to be removed. Correct component location and orientation are necessary for proper aerator operation.

NOTE: The crank shafts that have two (2) crank arms attached can be identified by engravings on one end of the crank shaft. When assembled, the engraving should be orientated toward the left side of the machine when viewed from the rear. Refer to Coring Crankshaft in this section for crankshaft illustration (Fig. 10).

NOTE: Many of the coring crankshaft components depend on proper orientation. Crank pin (item 7) head position, crank arm location on the coring crankshaft, crank arm angle on the crank shaft (item 12) and bearing housing (item 11) ball bearing flange direction all need to be correctly placed for proper aerator operation. During bearing housing removal, carefully note position of components to allow proper assembly.

Removal (Fig. 11)

1. Position aerator on a firm, level surface. If aerator is attached to tractor, disengage PTO, apply tractor parking brake, stop engine and remove key from the ignition switch.

2. Unlatch, open and support back cover to allow access to coring crankshaft.

3. If bearing housing with drive chain attached is to be removed, remove coring head drive chain (see Coring Head Drive Disassembly in this section).

WARNING

As crankshaft components are removed from machine, the crankshaft will become out of balance and may rotate quickly, creating pinch points and potential for personal injury. Be cautious when disassembling the coring crankshaft.

IMPORTANT: When loosening crank nut (item 9) DO NOT use a pipe wrench or other adjustable wrench. Damage to the crank nut (item 9), crank shaft (item 12) and crank pin (item 7) may occur if adjustable wrench is used.

4. Remove crank pins and connecting rods on both sides of bearing housing that is to be removed (see Connecting Rod Removal in this section).

5. Support bearing housing assembly to prevent it from falling. Remove two (2) cap screws and lock nuts that secure bearing housing assembly to coring head frame. Remove bearing housing assembly (with crank arms attached) from machine.

6. Disassemble bearing housing assembly:

IMPORTANT: The crank arms on either side of a bearing housing may be different. Before bearing housing disassembly, make sure to note location and orientation of crank arms. Incorrect alignment of crank arms will prevent smooth aerator operation and will lead to aerator damage.

A. Note crank arm alignment with each other for assembly purposes. If desired, use a marker to make a **diagonal** line across the bearing housing and crank arms for assembly purposes.

B. Secure bearing housing assembly in a vise.

C. Remove cotter pin (item 3) and crank nut (item 9) that secure one of the crank arms to crank shaft.

D. Slide crank arm from crank shaft.

E. If sprocket is attached to removed crank arm, remove sprocket if necessary (Fig. 12).

F. Slide crank shaft with attached crank arm from bearing housing assembly.

G. If necessary, remove retaining rings and bearings from bearing housing (Fig. 13). Discard removed bearings.

H. If removal of the second crank arm is necessary, make sure that alignment of crank arm to crank shaft is noted and then remove cotter pin, crank nut and second crank arm from crank shaft.

7. If necessary, remove and discard spring pins (item 10).

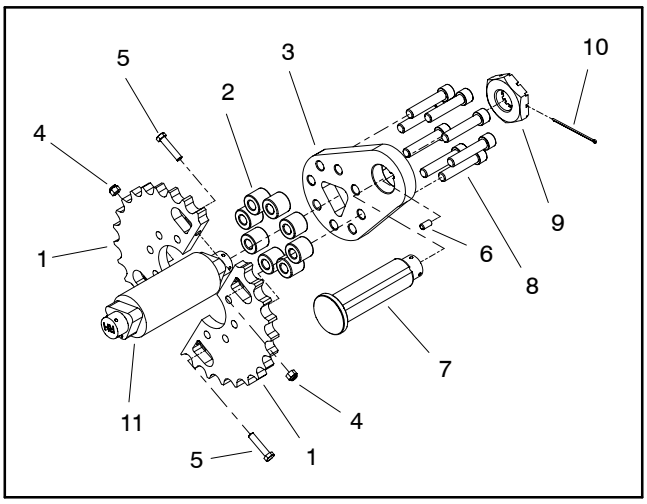

Figure 12

1. **Sprocket half**
2. **Spacer (8 used)**
3. **Crank arm**
4. **Lock nut (2 used)**
5. **Cap screw (2 used)**
6. **Dowel pin**
7. **Crank pin**
8. **Screw (8 used)**
9. **Crank nut**
10. **Cotter pin**
11. **Crank shaft**

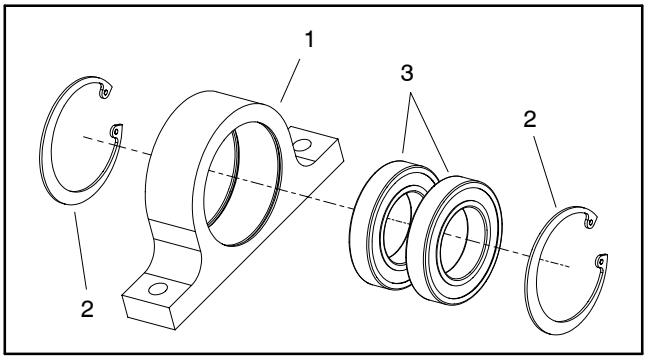

Figure 13

1. **Bearing housing**
2. **Retaining ring**
3. **Bearing**

Installation (Fig. 11)

1. If bearings were removed from bearing housing, install new bearings into housing (Fig. 13):

   A. Install one (1) retaining ring into groove in bore of housing. Make sure that retaining ring is properly seated in groove.

   B. Press a new bearing into the housing bore until the bearing contacts the installed retaining ring.

   C. Press second bearing into bore so that it contacts previously installed bearing.

   D. Install second retaining ring into groove in housing bore. Make sure that retaining ring is properly seated in groove.

2. If spring pins were removed, drive new spring pins into frame holes.

3. Install components into bearing housing assembly:

   A. If either of the removed crank arms included a drive sprocket, install sprocket if it was removed (Fig. 12). Make sure that crank pin is installed into crank arm before sprocket is installed.

   B. If both crank arms were removed from crank shaft, use notes made during disassembly to properly orientate one of the crank arms and slide onto crank shaft. Install crank shaft nut onto crank shaft threads to secure crank arm to crank shaft.

   C. Apply antiseize lubricant liberally to crank shaft (item 12). Slide crank shaft into bearing housing assembly.

   D. Using notes made during disassembly, properly orientate second crank arm and slide onto crank shaft.

   E. Install crank nut onto crankshaft threads to secure second crank arm to crank shaft.

4. Position bearing housing assembly to aerator frame. Install and tighten two (2) cap screws and lock nuts to secure bearing housing assembly to coring head frame.

5. Install crank pins and connecting rods on both sides of bearing housing (see Connecting Rod Installation in this section).

6. Rotate coring crankshaft to allow access to crank nuts (item 9) that secure crank arms and connecting rods on both sides of crankshaft bearing housing.

IMPORTANT: When tightening crank nut (item 9) DO NOT use a pipe wrench or other adjustable wrench. Damage to the crank nut (item 9), crank shaft (item 12) and crank pin (item 7) may occur if adjustable wrench is used.

7. Insert block of wood between aerator frame and connecting rod to prevent the crankshaft from turning. Torque crank nuts (item 9) that secure crank arms and connecting rods on both sides of crankshaft bearing housing to **1200 ft-lb (1627 N-m)**.

8. After assembly, rotate coring crankshaft by hand to make sure that no binding occurs.

9. Install cotter pins (item 3) in removed crank nuts.

IMPORTANT: When installing coring head drive chains, make sure that one of the chains is installed and properly tensioned before installing second chain.

10. If removed, install coring head drive chain (see Coring Head Drive Assembly in this section). Make sure that chain is properly tensioned.

11. Lower and secure back cover.

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Coring Head Drive Chain

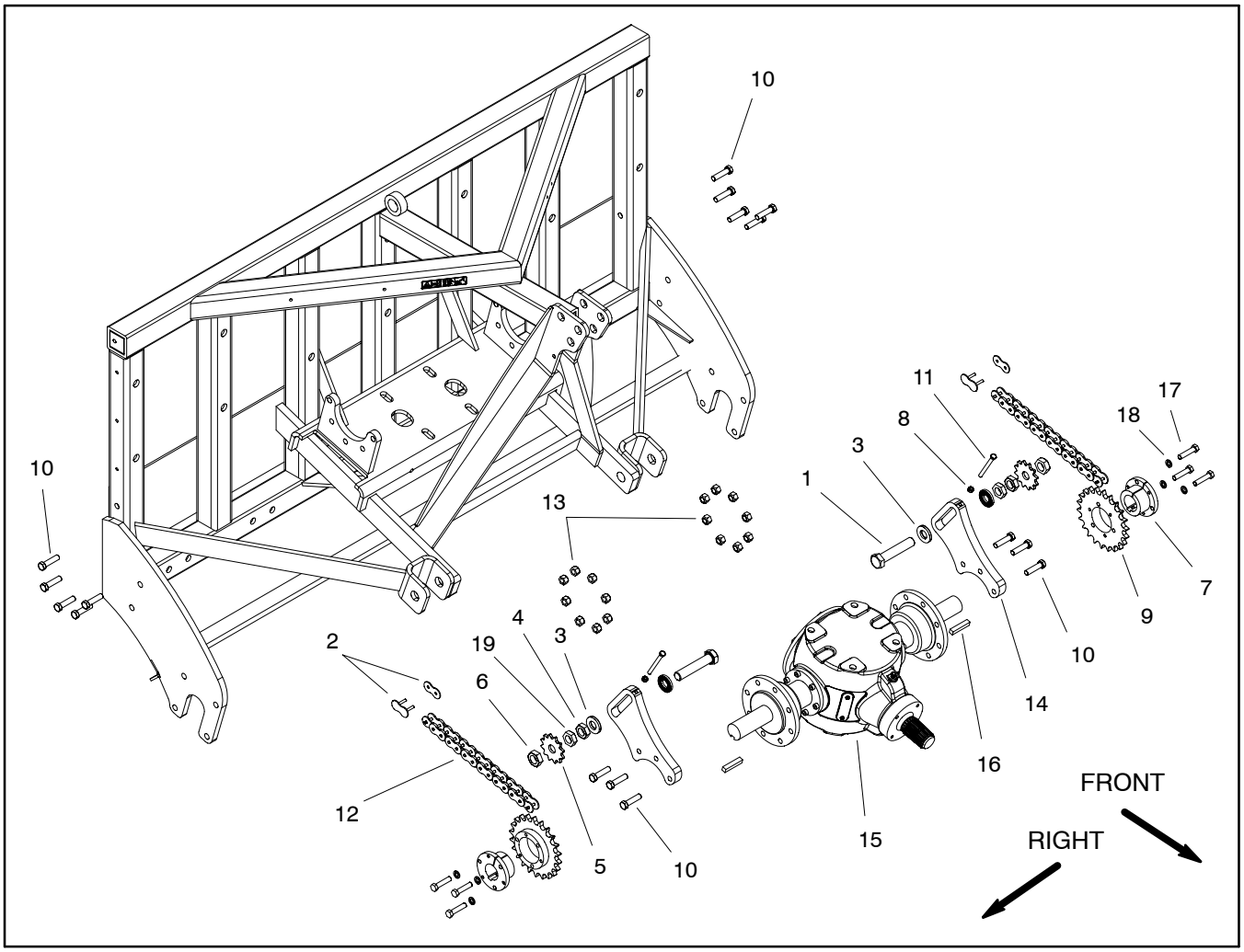

Figure 14

1. **Idler bolt (2 used)**
2. **Master link assembly (2 used)**
3. **Grooved washer (2 used)**
4. **Jam nut (2 used)**
5. **Idler sprocket (2 used)**
6. **Lock nut (2 used)**
7. **Sprocket hub (2 used)**
8. **Jam nut (2 used)**
9. **Sprocket (2 used)**
10. **Saddle bolt (16 used)**
11. **Jam rod (2 used)**
12. **Drive chain (2 used)**
13. **Lock nut (16 used)**
14. **Idler bracket (2 used)**
15. **Gearbox assembly**
16. **Square key (2 used)**
17. **Cap screw (3 used per hub)**
18. **Lock washer (3 used per hub)**
19. **Idler sprocket jam nut (2 used)**

Disassembly (Fig. 14)

1. Position aerator on a firm, level surface. If aerator is attached to tractor, disengage PTO, apply tractor parking brake, stop engine and remove key from the ignition switch.

2. Raise and support rear hood.

3. Loosen jam nuts (items 4 and 8) and jam rod (item 11) to remove idler tension on drive chain.

4. Rotate coring crankshaft until drive chain master link is located at gearbox sprocket. Note direction of closed end of master link clip for assembly purposes. Remove master link from drive chain. Locate and remove master link O−rings.

5. Remove drive chain from gearbox, coring crankshaft and idler sprockets (Fig. 15).

6. If necessary, remove sprocket(s) from gearbox shaft (see Coring Head Drive Sprockets Disassembly in this section).

7. If sprocket removal from coring crankshaft is necessary, remove coring crankshaft bearing housing that includes sprocket and remove sprocket from crank arm (see Coring Crankshaft Bearing Housing Removal in this section).

8. If necessary, remove idler assembly using Figure 14 as a guide.

Assembly (Fig. 14)

1. If coring crankshaft sprocket was removed, secure sprocket to crank arm and install coring crankshaft bearing housing (see Coring Crankshaft Bearing Housing Installation in this section).

2. If sprockets were removed from gearbox shaft, install sprockets to gearbox shaft (see Coring Head Drive Sprockets Assembly in this section).

3. If idler assembly parts were removed from frame, install idler components using Figure 14 as a guide. Do not fully tighten inner jam nut (item 4) at this time.

4. Using a suitable straight edge, check that alignment between gearbox, coring crankshaft and idler sprockets is correct. If needed, readjust sprocket location on gearbox shaft to align sprockets.

IMPORTANT: When installing drive chains, install and properly tension one of the drive chains. Then, install second chain.

5. If both drive chains were removed, install first drive chain:

A. Position drive chain to gearbox sprocket, pull lower run of chain tight and align with coring crankshaft sprocket teeth. If necessary, slightly rotate coring crankshaft so that chain remains tight when aligned with sprocket teeth. Route chain under idler sprocket and back to gearbox sprocket (Fig. 15). Do not allow lower run of chain to have excessive slack.

B. Apply grease to master link O−rings. Place two (2) O−rings on master link pins and install into ends of drive chain. Place final two (2) O−rings on master link pins and install side plate.

C. Install master link clip so that the closed end is facing the direction of chain rotation.

IMPORTANT: To prevent gearbox damage, do not overtighten drive chains. Drive chains should have 1/2" (12.7 mm) total deflection when properly adjusted.

D. Adjust idler sprocket location with jam rod (item 11) so that chain has 1/2" (12.7 mm) total deflection at mid−span between sprockets. Make sure that jam nuts (items 4 and 8) are fully tightened after chain adjustment is completed.

6. Block crankshaft to prevent it from rotating. Install and adjust second drive chain using procedure listed in step 5 above.

7. After assembly, rotate coring crankshaft by hand to make sure that no binding occurs.

8. Lower and secure rear hood.

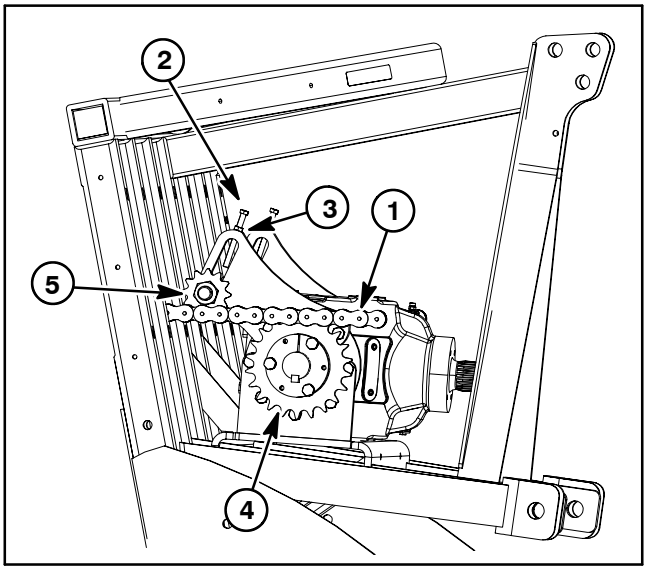

Figure 15

1. **Drive chain**
2. **Jam rod**
3. **Jam nut**
4. **Gearbox sprocket**
5. **Idler sprocket**

Coring Head Drive Sprockets

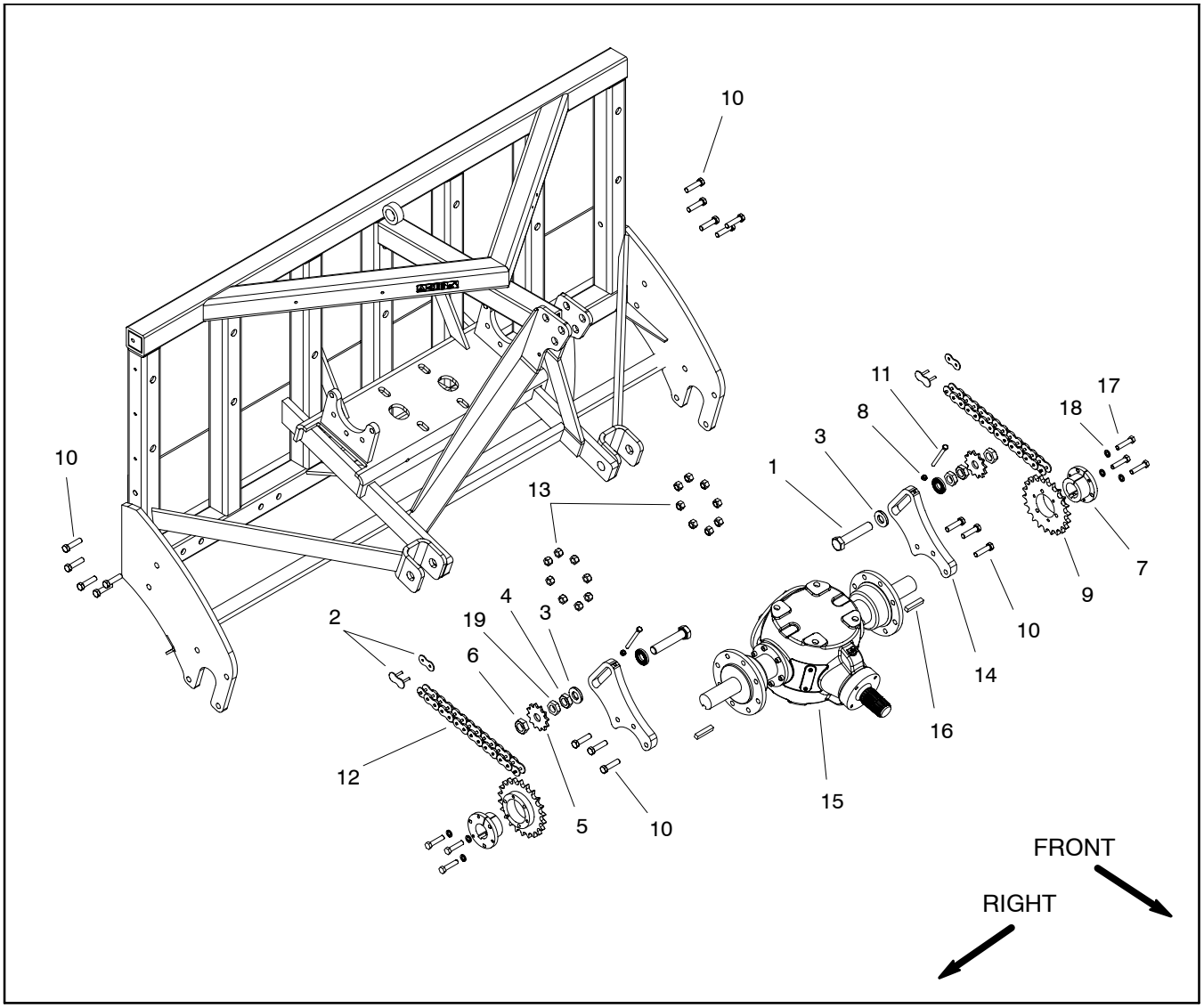

Figure 16

1. **Idler bolt (2 used)**
2. **Master link assembly (2 used)**
3. **Grooved washer (2 used)**
4. **Jam nut (2 used)**
5. **Idler sprocket (2 used)**
6. **Lock nut (2 used)**
7. **Sprocket hub (2 used)**
8. **Jam nut (2 used)**
9. **Sprocket (2 used)**
10. **Saddle bolt (16 used)**
11. **Jam rod (2 used)**
12. **Drive chain (2 used)**
13. **Lock nut (16 used)**
14. **Idler bracket (2 used)**
15. **Gearbox assembly**
16. **Square key (2 used)**
17. **Cap screw (3 used per hub)**
18. **Lock washer (3 used per hub)**
19. **Idler sprocket jam nut (2 used)**

Disassembly (Fig. 16)

1. Position aerator on a firm, level surface. If aerator is attached to tractor, disengage PTO, apply tractor parking brake, stop engine and remove key from the ignition switch.

2. Raise and support rear hood.

3. Remove front screens (see Covers Removal in the Service and Repairs section of Chapter 3 – Chassis).

4. Remove drive chains (see Coring Head Drive Chain Disassembly in this section).

5. Remove sprocket(s) from gearbox shaft:

A. Measure distance from end of gearbox output shaft to location of sprocket hub for assembly purposes. Record measurement.

B. Remove three (3) cap screws (item 17) and lock washers (item 18) that secure sprocket to sprocket hub.

IMPORTANT: Excessive or unequal pressure on the cap screws can break the sprocket hub flange. When removing sprocket from hub, tighten screws progressively and evenly.

C. Insert three (3) cap screws into threaded removal holes of the sprocket hub. Tighten screws progressively and evenly until the sprocket is loose on the hub. Position sprocket away from hub.

D. Remove set screw that secures sprocket hub to gearbox shaft.

E. Remove hub, sprocket and square key from gearbox shaft.

6. If sprocket removal from coring crankshaft is necessary, remove coring crankshaft bearing housing that includes sprocket and remove sprocket from crank arm (see Coring Crankshaft Bearing Housing Removal in this section).

Assembly (Fig. 16)

1. If coring crankshaft sprocket was removed, secure sprocket to crank arm and install coring crankshaft bearing housing (see Coring Crankshaft Bearing Housing Installation in this section).

2. Install sprockets to gearbox shaft:

A. Make sure that tapered surfaces of sprocket and sprocket hub are thoroughly clean (no oil, grease, dirt, rust, etc.).

B. Position square key in gearbox shaft slot. Apply antiseize lubricant to bore of sprocket hub.

C. Slide sprocket and hub onto gearbox shaft making sure that tapered surfaces of sprocket and hub align.

D. Position hub location from end of gearbox shaft as measured before removal. Secure hub to gearbox shaft with set screw.

IMPORTANT: When securing sprocket and sprocket hub, tighten cap screws in three (3) equal steps and in a circular pattern to prevent hub flange damage.

E. Align threaded holes of sprocket with non–threaded holes of sprocket hub and install three (3) cap screws (item 17) with lock washers (item 18). Tighten cap screws in three (3) equal steps and in a circular pattern to secure sprocket and sprocket hub.

3. Using a suitable straight edge, check that alignment between gearbox, coring crankshaft and idler sprockets is correct. If needed, readjust sprocket location on gearbox shaft to align sprockets.

4. Install and tension drive chains (see Coring Head Drive Chain Assembly in this section).

5. Install front screens to machine (see Covers Installation in the Service and Repairs section of Chapter 3 – Chassis).

6. Lower and secure rear hood.

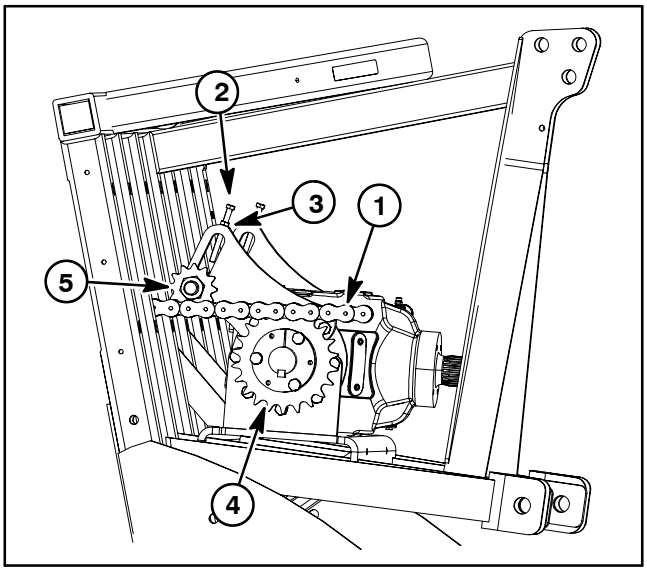

Figure 17

1. **Drive chain**
2. **Jam rod**
3. **Jam nut**
4. **Gearbox sprocket**
5. **Idler sprocket**

Gearbox

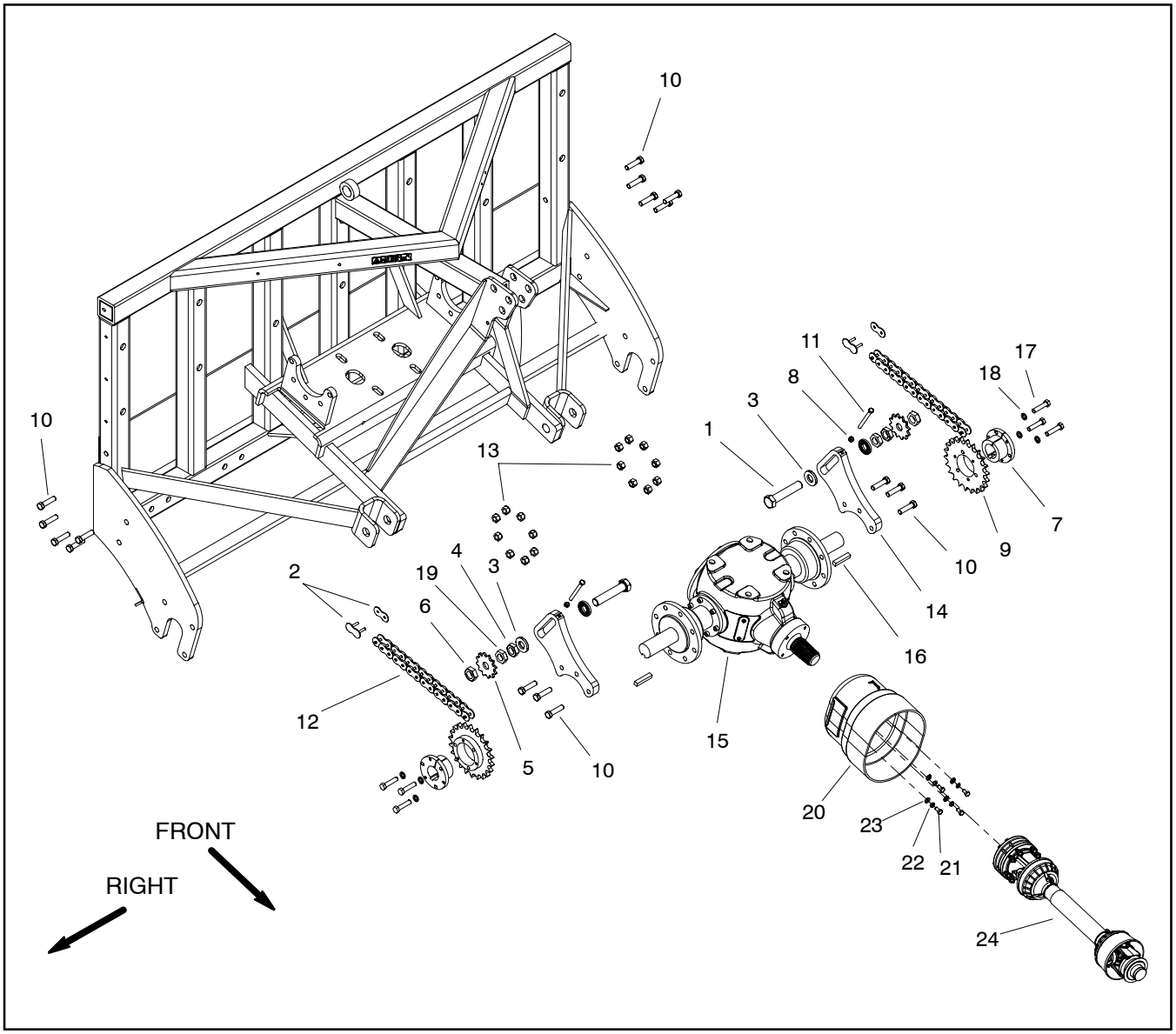

Figure 18

1. Idler bolt (2 used)
2. Master link assembly (2 used)
3. Grooved washer (2 used)
4. Jam nut (2 used)
5. Idler sprocket (2 used)
6. Lock nut (2 used)
7. Sprocket hub (2 used)
8. Jam nut (2 used)
9. Sprocket (2 used)
10. Saddle bolt (16 used)
11. Jam rod (2 used)
12. Drive chain (2 used)
13. Lock nut (16 used)
14. Idler bracket (2 used)
15. Gearbox assembly
16. Square key (2 used)
17. Cap screw (3 used per hub)
18. Lock washer (3 used per hub)
19. Idler sprocket jam nut (2 used)
20. PTO driveshaft shield
21. Cap screw (4 used)
22. Lock washer (4 used)
23. Flat washer (4 used)
24. PTO driveshaft

Removal (Fig. 18)

1. Position aerator on a firm, level surface. If aerator is attached to tractor, disengage PTO, apply tractor parking brake, stop engine and remove key from the ignition switch.

2. Remove screens from aerator frame (see Covers Removal in the Service and Repairs section of Chapter 3 – Chassis).

3. Drain lubricant from gearbox.

4. Disconnect PTO driveshaft from gearbox input shaft (see PTO Driveshaft Removal in the Service and Repairs section of Chapter 3 – Chassis).

5. Remove four (4) cap screws, lock washers and flat washers that secure driveshaft shield (item 20) to gearbox. Remove shield.

6. Remove drive chain, sprocket and sprocket hub from both gearbox output shafts (see Coring Head Drive Disassembly in this section).

7. Remove saddle bolts (item 10) that secure gearbox flanges to frame.

8. Remove four (4) cap screws and lock washers that secure gearbox to aerator frame.

CAUTION

To prevent personal injury, make sure that gearbox is supported as it is removed from the machine. Gearbox weighs approximately 220 pounds (100 kg).

NOTE: For gearbox disassembly and assembly information, refer to the Service and Repairs section of Chapter 7 – Gearbox Service.

Installation (Fig. 18)

IMPORTANT: If a gearbox is incorrectly assembled or installed (e.g. output shaft installed into gearbox in reverse direction or gearbox placed on frame upside down), there is a possibility that gearbox output shaft rotation will be incorrect for proper aerator operation. After placing the gearbox on the frame, make sure that rotation of the input shaft results in the correct output shaft rotation direction. Figure 19 shows correct shaft rotation direction for the gearbox shafts. If rotation is incorrect, check gearbox assembly and installation before proceeding with installation procedure.

CAUTION

To prevent personal injury, make sure that gearbox is supported as it is installed to the machine. Gearbox weighs approximately 220 pounds (100 kg).

1. Position gearbox to aerator frame. Secure gearbox to frame with four (4) cap screws and lock washers.

2. Install and tighten saddle bolts (item 10) to frame and gearbox flanges.

3. Install drive chain, sprocket and sprocket hub to both gearbox output shafts (see Coring Head Drive Assembly in this section). Make sure that drive chain is properly adjusted after assembly.

4. Position driveshaft shield (item 20) to gearbox and secure with four (4) cap screws, lock washers and flat washers.

5. Connect PTO driveshaft to gearbox input shaft (see PTO Driveshaft Installation in the Service and Repairs section of Chapter 3 – Chassis).

6. Fill gearbox with proper lubricant (see Operator's Manual).

7. Install screens to aerator (see Covers Installation in the Service and Repairs section of Chapter 3 – Chassis).

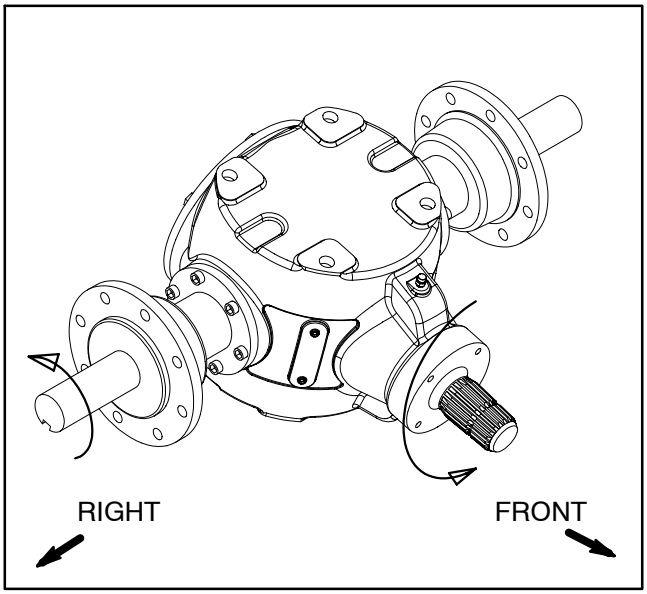

Figure 19

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Chapter 7

Gearbox Service

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General Information

Gearbox Service

The gearbox disassembly and assembly procedures listed in this chapter assume that the gearbox assembly has been removed from the machine. Refer to the correct Coring Head chapter for information on removing gearbox assembly from aerator.

Gearbox Service (SR48, SR70 and SR70-S)

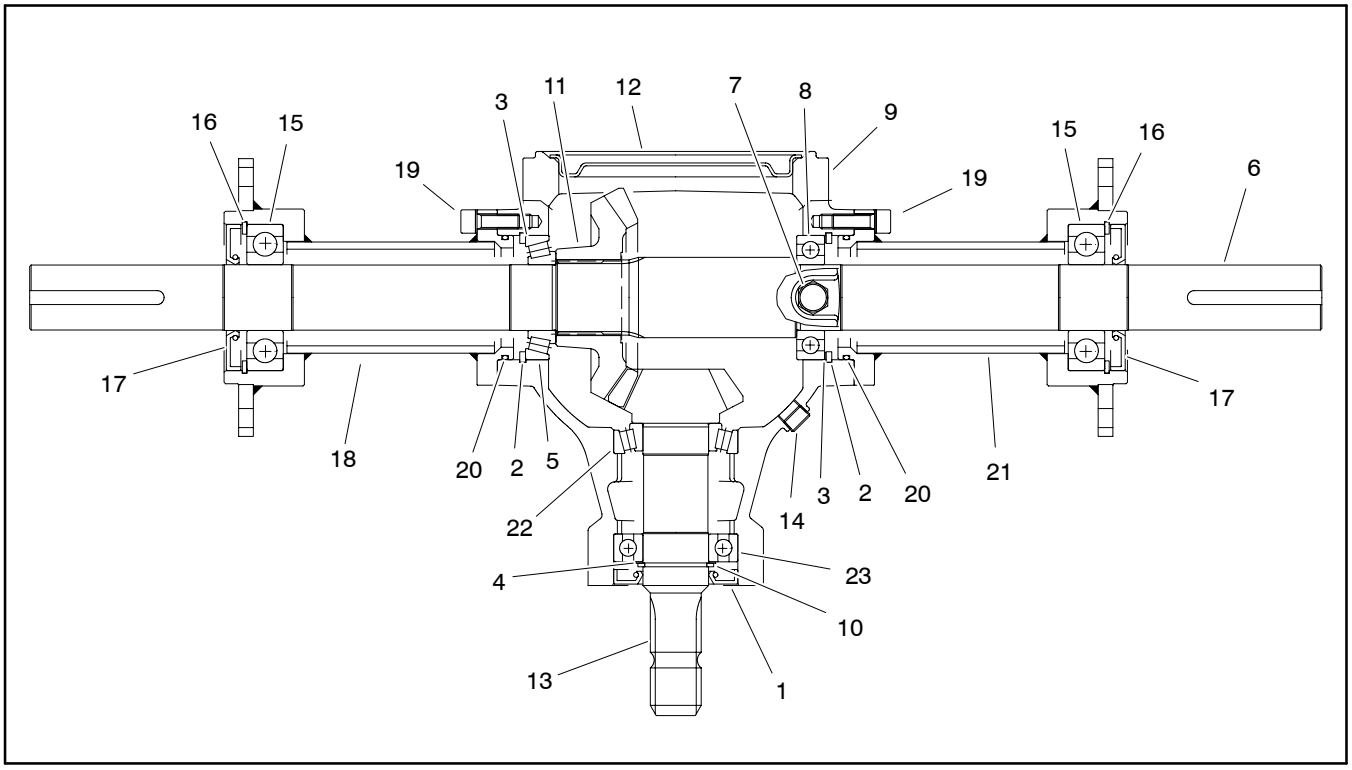

Figure 1

1. **Oil seal**
2. **Retaining ring**
3. **Shim set (gear backlash)**
4. **Shim set (input shaft endplay)**
5. **Tapered bearing (cup and cone)**
6. **Output shaft**
7. **Relief vent**
8. **Ball bearing**
9. **Housing**
10. **Retaining ring**
11. **Bevel gear**
12. **Cover plate**
13. **Input shaft**
14. **Plug (3 used)**
15. **Ball bearing**
16. **Retaining ring**
17. **Oil seal**
18. **Axle tube**
19. **Socket head screw (6 per tube)**
20. **O-ring**
21. **Axle tube**
22. **Inner bearing (cup and cone)**
23. **Outer bearing**

Gearbox Disassembly (Fig. 1)

1. Thoroughly clean all corrosion and burrs from output shaft and input shaft to allow easier gearbox disassembly.

2. Use a marker to make a **diagonal** line across the housing and axle tubes for assembly purposes (Fig. 2).

3. Carefully pry cover plate (item 12) from rear of housing taking care to not damage housing opening. Check that sealing surface of cover is not damaged. Replace cover if necessary.

4. Remove socket head screws (item 19) that secure axle tubes (items 18 and 21) to housing. Slide axle tube assemblies from gearbox.

5. Use a press to remove output shaft and bearings from gearbox housing:

NOTE: Shim set (item 3) is used to adjust gearbox backlash. When removing output shaft, take note of location and number of shims to assist in gearbox assembly.

A. Remove retaining ring (item 2) and shim(s) (item 3) from ball bearing (item 8) side of gearbox housing.

B. Support bevel gear (item 11) to prevent it from falling during output shaft removal.

C. Press output shaft toward the ball bearing side of the housing to remove shaft. Ball bearing (item 8) will be pressed out of housing during shaft removal. Tapered bearing cone (item 5) and bevel gear will be removed from shaft as the shaft is pressed out of housing.

D. Remove bevel gear and tapered bearing cone from housing.

E. Remove ball bearing from output shaft.

F. Remove retaining ring (item 2), shim(s) (item 3) and tapered bearing cup from gearbox housing.

G. Discard removed bearings.

6. Use a press to remove input shaft and bearings from gearbox housing:

A. Remove oil seal (item 1) from gearbox housing taking care to not damage seal bore in housing. Discard oil seal.

NOTE: Shim set (item 4) is used to adjust input shaft bearing pre-load. When removing input shaft, take note of location and number of shims to assist in gearbox assembly.

B. Remove retaining ring (item 10) and shim(s) (item 4) from input shaft.

C. Press input shaft toward rear opening of gearbox housing to remove shaft.

D. Remove outer bearing (item 23) from housing.

E. Using a press, remove inner bearing (item 22) cone from input shaft and bearing cup from housing.

F. Discard removed bearings.

7. Disassemble axle tubes:

A. Remove oil seal (item 17) from axle tube taking care to not damage seal bore in tube. Discard seal.

B. Remove retaining ring (item 16).

C. Press bearing (item 15) from axle tube. Discard removed bearing.

D. Remove and discard O-ring (item 20) from inner flange of axle tube.

8. Thoroughly clean and inspect all gearbox components. Replace all worn or damaged parts.

Gearbox Assembly (Fig. 1)

1. Assemble axle tubes:

A. Press new bearing (item 15) into axle tube. Make sure that bearing is pressed fully to shoulder in tube.

B. Install retaining ring (item 16). Make sure that retaining ring is fully seated in retainer groove.

C. Apply a light coating of grease on lips and OD of new oil seal (item 17). Install new seal into axle tube. Oil seal should be flush to slightly recessed into axle tube bore.

D. Lightly grease and install new O-ring (item 20) to inner flange of axle tube.

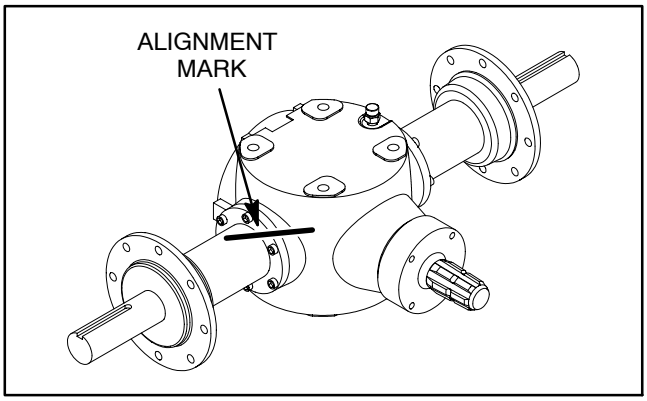

Figure 2

2. Install new bearings and input shaft into gearbox housing:

A. Press inner bearing (item 22) cone fully onto input shaft.

B. Press inner bearing (item 22) cup and outer bearing (item 23) fully into gearbox housing bores.

C. Install input shaft into gearbox housing through rear opening of housing.

D. Install the removed shim(s) (item 4) and retaining ring (item 10) onto input shaft. If necessary, remove or add shims so that the shim(s) fit tightly between the retaining ring and outer bearing. Make sure that retaining ring is fully seated in shaft groove and that there is no endplay in input shaft assembly.

IMPORTANT: Before installing output shaft into gearbox housing, input shaft bearing pre-load must be checked and, if necessary, adjusted.

3. Check and adjust input shaft bearing pre-load:

A. Use a piece of string and a spring scale to determine the resistance to rotate the input shaft. Wrap the string around the input shaft and attach the spring scale to the string end.

B. Once the input shaft is rotating, the resistance to continue to rotate the shaft should be from 2 to 3 in-lbs (0.23 to 0.34 N-m). Repeat this process a few times until a consistent resistance is determined.

C. If rotating resistance is below 2 in-lb (0.23 N-m), add additional shim(s) behind the retaining ring (item 10). If resistance is above 3 in-lb (0.34 N-m), remove shim(s) from behind the retaining ring.

D. Retest rotating resistance after adding or removing shims.

E. Continue shim placement until input shaft rotating resistance is consistently from 2 to 3 in-lbs (0.23 to 0.34 N-m).

4. Install output shaft assembly into gearbox housing:

   A. Press ball bearing (item 8) onto output shaft. Make sure that bearing is pressed fully to shaft shoulder.

   B. Position bevel gear (item 11) and tapered bearing cone (item 5) inside gearbox housing. Make sure that bevel gear teeth mesh properly with gear on input shaft. Slide output shaft through ball bearing opening of housing, bevel gear, tapered bearing cone and then tapered bearing opening of housing.

   C. Insert tapered bearing cup (item 5) into bearing bore of gearbox housing.

   D. Install the removed shim(s) (item 3) and retaining ring (item 2) into gearbox tapered bearing bore. Make sure that retaining ring is fully seated in housing groove.

   E. Install the removed shim(s) (item 3) and retaining ring (item 2) into gearbox ball bearing bore. Make sure that retaining ring is fully seated in housing groove.

5. Check that there is no end play in the output shaft and that output shaft bearings are not pre-loaded. If output shaft end play is determined, add additional shim(s) (item 3) as needed. If bearing pre-load (drag) is determined, remove shim(s).

6. Check gearbox backlash:

IMPORTANT: Correct engagement between bevel gear and input shaft gear is critical to gearbox performance and durability.

   A. Position a dial indicator at the center of a tooth on the bevel gear.

   B. While preventing the input shaft from turning, rotate the bevel gear and monitor the dial indicator reading to check gearbox backlash. Allowable backlash is from 0.010" to 0.012" (0.25 to 0.30 mm).

   IMPORTANT: If backlash adjustment is necessary, do not simply remove shims from one side of output shaft assembly as this would affect output shaft endplay. Shims must be moved from one side of the output shaft to the other side during backlash adjustment.

   C. If backlash is excessive (greater than 0.012"), move shim(s) (item 3) from ball bearing side of gearbox to the tapered bearing side of gearbox. This shim movement will move bevel gear closer to the input shaft gear to reduce backlash.

   D. If backlash is insufficient (less than 0.010"), move shim(s) (item 3) from tapered bearing side of gearbox to the ball bearing side. This shim movement will move bevel gear away from the input shaft gear to increase backlash.

   E. Recheck backlash after any shim change. Repeat process until gearbox backlash is correct.

7. Apply light coating of Permatex® No. 2 to sealing surface of cover plate (item 12). Use a soft face hammer to drive cover plate into housing.

8. Carefully slide axle tube assemblies onto gearbox shafts taking care to not damage seals. Align marker line on housing and axle tube (Fig. 2). Secure axle tubes to housing with socket head screws (item 19).

9. Apply a light coating of grease on lips and OD of input seal (item 1). Install seal into gearbox bore taking care to not damage seal during installation. Oil seal should be flush to slightly recessed into gearbox bore.

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Gearbox Service (SR54 and SR54-S)

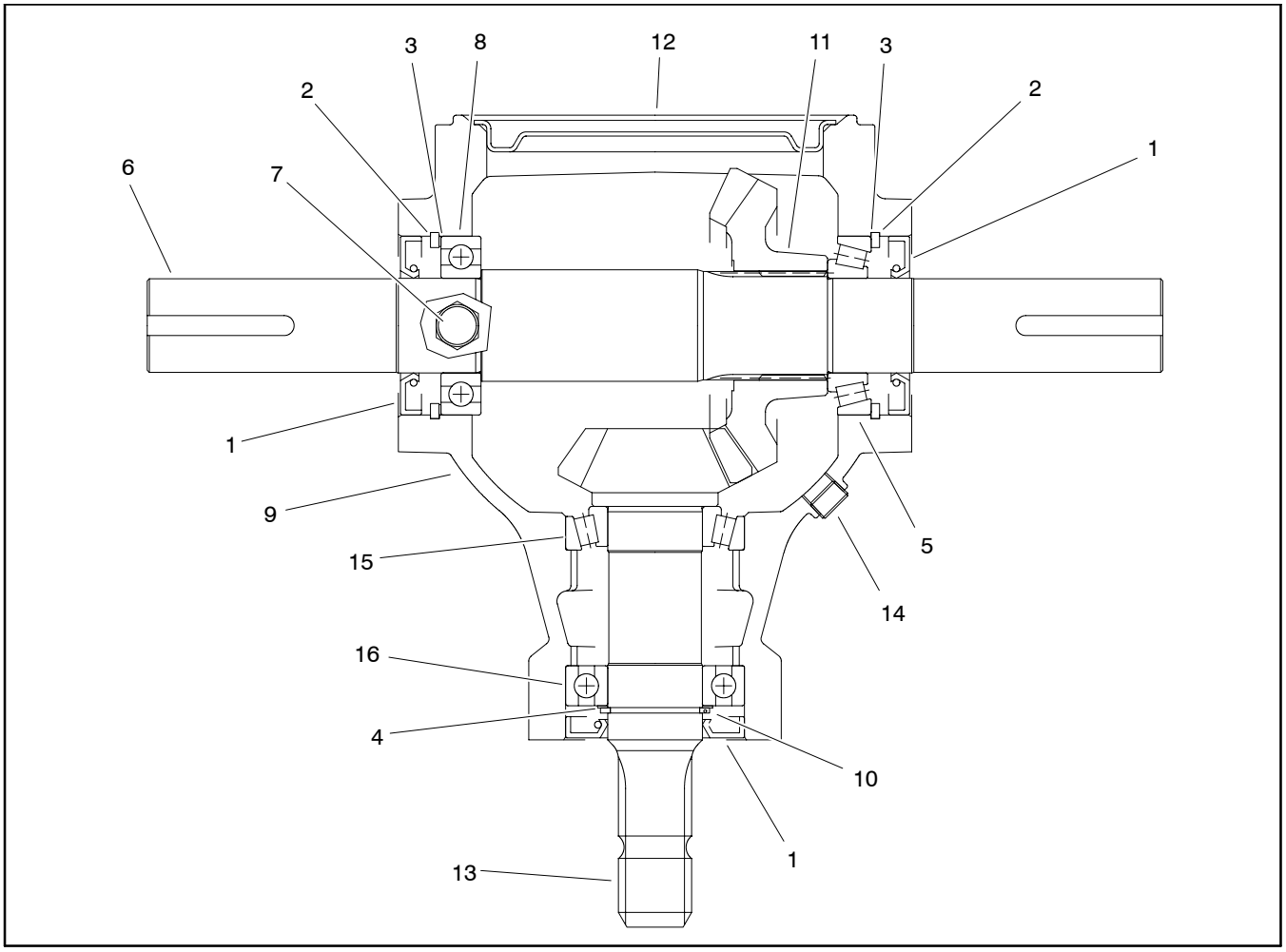

Figure 3

1. **Oil seal**
2. **Retaining ring**
3. **Shim set (gear backlash)**
4. **Shim set (input shaft endplay)**
5. **Tapered bearing (cup and cone)**
6. **Output shaft**
7. **Relief vent**
8. **Ball bearing**
9. **Housing**
10. **Retaining ring**
11. **Bevel gear**
12. **Cover plate**
13. **Input shaft**
14. **Plug (3 used)**
15. **Inner bearing**
16. **Outer bearing**

Gearbox Disassembly (Fig. 4)

1. Thoroughly clean all corrosion and burrs from output shaft and input shaft to allow easier gearbox disassembly.

2. Carefully pry cover plate (item 12) from rear of housing taking care to not damage housing opening. Check that sealing surface of cover is not damaged. Replace cover if necessary.

3. Remove three (3) oil seals (item 1) from gearbox housing taking care to not damage seal bores in housing. Discard oil seals.

4. Use a press to remove output shaft and bearings from gearbox housing:

NOTE: Shim set (item 3) is used to adjust gearbox backlash. When removing output shaft and bearings, take note of location and number of shims to assist in assembly process.

A. Remove retaining ring (item 2) and shim(s) (item 3) from ball bearing side of gearbox housing.

B. Support bevel gear (item 11) to prevent it from falling.

C. Press output shaft toward the ball bearing (item 8) side of the housing to remove shaft. Ball bearing should remain on shaft.

D. Remove bevel gear and tapered bearing cone (item 5) from housing.

E. Press ball bearing from output shaft.

F. Remove retaining ring (item 2), shim(s) (item 3) and tapered bearing cup from gearbox housing.

G. Discard removed bearings.

5. Use a press to remove input shaft and bearings from gearbox housing:

NOTE: Shim set (item 4) is used to adjust input shaft bearing pre-load. When removing input shaft, take note of location and number of shims to assist in assembly process.

A. Remove retaining ring (item 10) and shim(s) (item 4) from gearbox input shaft.

B. Press input shaft toward rear opening of gearbox housing to remove shaft.

C. Remove outer bearing (item 16) from housing.

D. Using a press, remove inner bearing cone (item 15) from input shaft and bearing cup from housing.

E. Discard removed bearings.

6. Thoroughly clean and inspect all gearbox components. Replace all worn or damaged parts.

Gearbox Assembly (Fig. 4)

1. Install new bearings and input shaft into gearbox housing:

A. Press inner bearing cone (item 15) fully onto input shaft.

B. Insert inner bearing cup (item 15) and outer bearing (item 16) into gearbox housing bores. Make sure that bearings are pressed fully to shoulder in housing.

C. Install input shaft into gearbox housing through rear opening of housing.

D. Install the removed shim(s) (item 4) and retaining ring (item 10) onto input shaft. If necessary, remove or add shims so that the shim(s) fit tightly between the retaining ring and outer bearing. Make sure that retaining ring is fully seated in shaft groove and that there is no endplay in input shaft assembly.

IMPORTANT: Before installing output shaft into gearbox housing, input shaft bearing pre-load must be checked and, if necessary, adjusted.

2. Check and adjust input shaft bearing pre-load:

A. Use a piece of string and a spring scale to determine the resistance to rotate the input shaft. Wrap the string around the input shaft and attach the spring scale to the string end.

B. Once the input shaft is rotating, the resistance to continue to rotate the shaft should be from 2 to 3 in-lbs (0.23 to 0.34 N-m). Repeat this process a few times until a consistent resistance is determined.

C. If rotating resistance is below 2 in-lb (0.23 N-m), add additional shim(s) behind the retaining ring (item 4). If resistance is above 3 in-lb (0.34 N-m), remove shim(s) from behind the retaining ring.

D. Retest rotating resistance after adding or removing shims.

E. Continue shim placement until input shaft rotating resistance is consistently from 2 to 3 in-lbs (0.23 to 0.34 N-m).

3. Install output shaft assembly into gearbox housing:

A. Press ball bearing (item 8) onto output shaft. Make sure that bearing is pressed fully to shaft shoulder.

B. Position bevel gear (item 11) and tapered bearing cone (item 5) inside gearbox housing. Make sure that bevel gear teeth mesh properly with gear on input shaft. Slide output shaft through ball bearing opening of housing, bevel gear, bearing cone and then tapered bearing opening of housing.

C. Insert tapered bearing cup (item 5) into bearing bore of gearbox housing.

D. Install the removed shim(s) (item 3) and retaining ring (item 2) into gearbox ball bearing bore. Make sure that retaining ring is fully seated in housing groove.

E. Install the removed shim(s) (item 3) and retaining ring (item 2) into gearbox tapered bearing bore. Make sure that retaining ring is fully seated in housing groove.

4. Check that there is no end play in the output shaft and that output shaft bearings are not pre-loaded. If output shaft end play is determined, add additional shim(s) (item 3) as needed. If bearing pre-load (drag) is determined, remove shim(s).

5. Check gearbox backlash:

IMPORTANT: Correct engagement between bevel gear and input shaft gear is critical to gearbox performance and durability.

A. Position a dial indicator at the center of a tooth on the bevel gear.

B. While preventing the input shaft from turning, rotate the bevel gear and monitor the dial indicator reading to check gearbox backlash. Allowable backlash is from 0.010" to 0.012" (0.25 to 0.30 mm).

IMPORTANT: If backlash adjustment is necessary, do not simply remove shims from one side of output shaft assembly as this would affect output shaft endplay. Shims must be moved from one side of the output shaft to the other side during backlash adjustment.

C. If backlash is excessive (greater than 0.012"), move shim(s) (item 3) from ball bearing side of gearbox to the tapered bearing side of gearbox. This shim movement will move bevel gear closer to the input shaft gear to reduce backlash.

D. If backlash is insufficient (less than 0.010"), move shim(s) (item 3) from tapered bearing side of gearbox to the ball bearing side of gearbox. This shim movement will move bevel gear away from the input shaft gear to increase backlash.

E. Recheck backlash after any shim change. Repeat process until backlash is correct.

6. Apply light coating of Permatex® No. 2 to sealing surface of cover plate (item 12). Use a soft face hammer to drive cover plate into housing.

7. Apply a light coating of grease on lips and OD of three (3) gearbox seals (item 1). Install seals into gearbox bores taking care to not damage seals during installation. Seals should be installed until they are flush to slightly recessed into gearbox bores.

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Gearbox Service (SR72 and SR75)

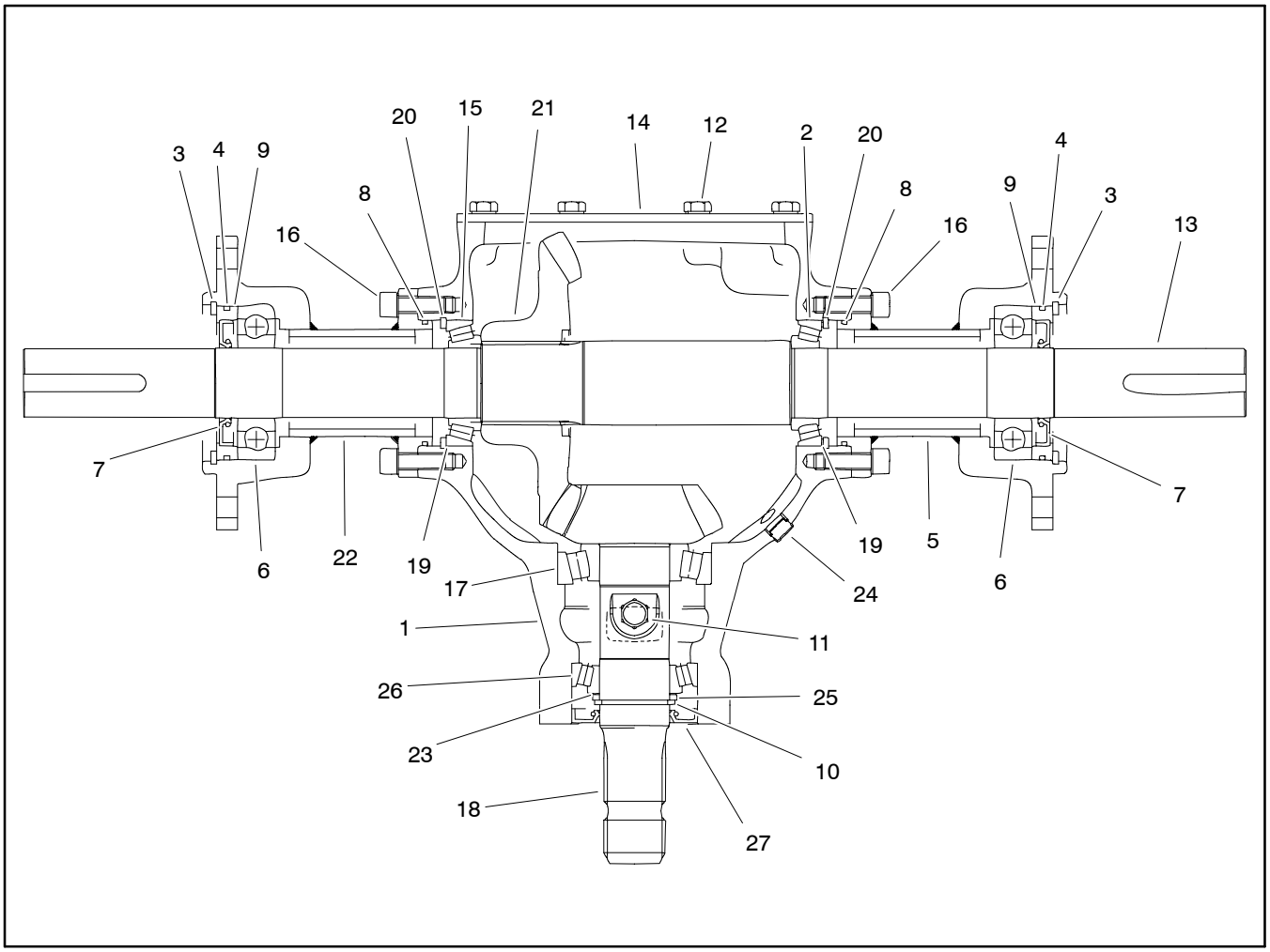

Figure 4

1. **Gearbox housing**
2. **Tapered bearing (non-gear side)**
3. **Retaining ring**
4. **O-ring**
5. **Axle tube**
6. **Bearing**
7. **Oil seal**
8. **O-ring**
9. **Seal retainer**
10. **Retaining ring**
11. **Breather plug**
12. **Cap screw with washer (8 used)**
13. **Output shaft**
14. **Cover plate**
15. **Tapered bearing (gear side)**
16. **Socket head screw (6 per sleeve)**
17. **Inner bearing**
18. **Input shaft**
19. **Shim set (gear backlash)**
20. **Retaining ring**
21. **Bevel gear**
22. **Axle tube**
23. **Shim set (input shaft endplay)**
24. **Plug**
25. **Spacer**
26. **Outer bearing**
27. **Oil seal**

Gearbox Disassembly (Fig. 4)

1. Thoroughly clean all corrosion and burrs from output shaft and input shaft to allow easier gearbox disassembly.

2. Use a marker to make a **diagonal** line across the housing and axle tubes for assembly purposes (Fig. 5).

3. Remove eight (8) cap screws and washers (item 12) that secure cover plate (item 14) to gearbox housing. Remove cover plate from housing.

4. Remove socket head screws (item 16) that secure axle tubes (items 5 and 22) to housing. Slide axle tube assemblies from gearbox.

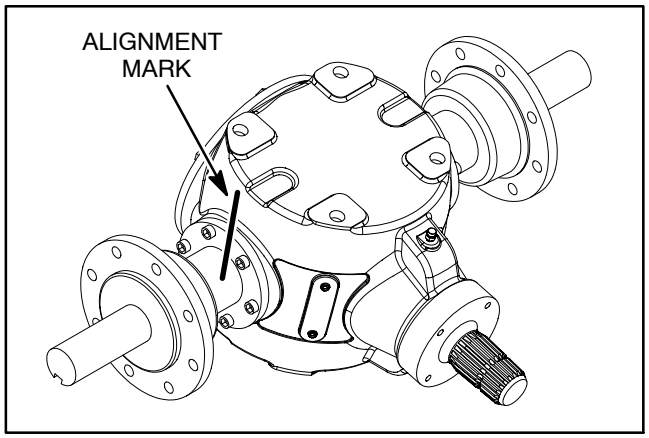

Figure 5

5. Use a press to remove output shaft and bearings from gearbox housing:

NOTE: Shim set (item 19) is used to adjust gearbox backlash. When removing output shaft and bearings, take note of location and number of shims to assist in assembly process.

A. Remove retaining ring (item 20) and shim(s) (item 19) from side of gearbox housing opposite the bevel gear (item 21).

B. Support bevel gear (item 21) to prevent it from falling.

C. Press output shaft through the bevel gear to remove shaft. The gear side bearing cone (item 15) will be removed during shaft removal. The non-gear side bearing (item 2) should remain on shaft.

D. Remove bevel gear and gear side bearing cone (item 15) from housing.

E. Remove non-gear side bearing (item 2) from output shaft.

F. Remove retaining ring (item 20) and shim(s) (item 19) from gear side of gearbox housing. Remove gear side bearing cup (item 15) from housing.

G. Discard removed bearings.

6. Use a press to remove input shaft and bearings from gearbox housing:

A. Remove oil seal (item 27) from gearbox housing. Discard oil seal.

NOTE: Shim set (item 23) is used to adjust input shaft bearing pre-load. When removing input shaft, take note of location and number of shims to assist in assembly process.

B. Remove retaining ring (item 10), spacer (item 25) and shim(s) (item 23) from gearbox input shaft bore.

C. Press input shaft toward rear opening of gearbox housing to remove shaft.

D. Remove outer bearing cone and both input shaft bearing cups from gearbox housing.

E. Using a press, remove inner bearing cone from input shaft.

F. Discard removed bearings.

7. Disassemble axle tubes:

A. Remove retaining ring (item 3) and seal retainer assembly (items 4, 7 and 9) from axle tube.

B. Remove and discard O-ring (item 4) and oil seal (item 7) from seal retainer. Note orientation of oil seal for assembly purposes.

C. Press bearing (item 6) from axle tube. Discard removed bearing.

D. Remove and discard O-ring (item 8) from inner flange of axle tube.

8. Thoroughly clean and inspect all gearbox components. Replace all worn or damaged parts.

Gearbox Assembly (Fig. 4)

1. Assemble axle tubes:

A. Press new bearing (item 6) into axle tube bore. Make sure that bearing is pressed fully to shoulder in axle tube.

B. Apply a light coating of grease on lips and OD of new oil seal (item 7). Install new oil seal into seal retainer. Make sure that seal is pressed fully to shoulder in seal retainer.

C. Lightly grease and install new O-ring (item 4) into seal retainer groove.

D. Install seal retainer assembly (items 4, 7 and 9) into axle tube and secure with retaining ring (item 3). Make sure that retaining ring is fully seated in axle tube groove.

E. Lightly grease and install new O-ring (item 8) to inner flange of axle tube.

2. Install new bearings and input shaft into gearbox housing:

A. Press inner bearing cone fully onto input shaft.

B. Install inner and outer bearing cups (items 17 and 26) into gearbox housing bores.

C. Install input shaft into gearbox housing through rear opening of housing.

D. While supporting gear end of input shaft, press outer bearing cone onto input shaft. Bearing should fit into installed outer bearing cup in gearbox housing.

E. Install the removed shim(s) (item 23), spacer (item 25) and retaining ring (item 10) onto input shaft. If necessary, remove or add shims so that the spacer fits tightly between the shims and retaining ring. Make sure that retaining ring is fully seated in shaft groove and that there is no endplay in input shaft assembly.

IMPORTANT: Before installing output shaft into gearbox housing, input shaft bearing pre-load must be checked and, if necessary, adjusted.

3. Check and adjust input shaft bearing pre-load:

   A. Use a piece of string and a spring scale to determine the resistance to rotate the input shaft. Wrap the string around the input shaft and attach the spring scale to the string end.

   B. Once the input shaft is rotating, the resistance to continue to rotate the shaft should be from 2 to 3 in-lbs (0.23 to 0.34 N-m). Repeat this process a few times until a consistent resistance is determined.

   C. If rotating resistance is below 2 in-lb (0.23 N-m), add additional shim(s) behind the spacer on the input shaft. If resistance is above 3 in-lb (0.34 N-m), remove shim(s) from behind the spacer.

   D. Retest rotating resistance after adding or removing shims.

   E. Continue shim placement until input shaft rotating resistance is consistently from 2 to 3 in-lbs (0.23 to 0.34 N-m).

4. Install output shaft assembly into gearbox housing:

   A. Press non-gear side bearing cone (item 2) onto output shaft. Make sure that bearing cone is pressed fully to shaft shoulder.

   B. Position bevel gear (item 21) and gear side bearing cone (item 15) inside gearbox housing. Make sure that bevel gear teeth mesh properly with gear on input shaft. Slide output shaft through non-gear side bearing opening of housing, bevel gear, gear side bearing cone and then gear side bearing opening of housing.

   C. Insert gear side bearing cup (item 15) into bearing bore of gearbox housing.

   D. Install the removed shim(s) (item 19) and retaining ring (item 20) into gear side bearing bore. Make sure that retaining ring is fully seated in housing groove.

   E. Insert non-gear side bearing cup (item 2) into bearing bore of gearbox housing. Make sure that bearing is pressed fully to bearing cone on shaft.

   F. Install the removed shim(s) (item 19) and retaining ring (item 20) into non-gear side bearing bore. Make sure that retaining ring is fully seated in housing groove.

5. Check that there is no end play in the output shaft and that output shaft bearings are not pre-loaded. If output shaft end play is determined, add additional shim(s) (item 19) as needed. If bearing pre-load (drag) is determined, remove shim(s).

6. Check gearbox backlash:

IMPORTANT: Correct engagement between bevel gear and input shaft gear is critical to gearbox performance and durability.

   A. Position a dial indicator at the center of a tooth on the bevel gear (item 21).

   B. While preventing the input shaft from turning, rotate the bevel gear and monitor the dial indicator reading to check gearbox backlash. Allowable backlash is from 0.010" to 0.012" (0.25 to 0.30 mm).

   IMPORTANT: If backlash adjustment is necessary, do not simply remove shims from one side of output shaft assembly as this would affect output shaft endplay. Shims must be moved from one side of the output shaft to the other side during backlash adjustment.

   C. If backlash is excessive (greater than 0.012"), move shim(s) (item 19) from non-gear side of gearbox to the gear side of gearbox. This shim movement will move bevel gear closer to the input shaft gear to reduce backlash.

   D. If backlash is insufficient (less than 0.010"), move shim(s) (item 19) from gear side of gearbox to the non-gear side. This shim movement will move bevel gear away from the input shaft gear to increase backlash.

   E. Recheck backlash after any shim change. Repeat process until backlash is correct.

7. Apply a light coating of Permatex® No. 2 to mating surface of cover plate (item 14). Position cover plate to gearbox housing opening. and secure with eight (8) cap screws and washers (item 12).

8. Carefully slide axle tube assemblies onto output shaft ends taking care to not damage seals. Align marker line on housing and axle tube (Fig. 5). Secure axle tubes to housing with socket head screws (item 16).

9. Apply a light coating of grease on lips and OD of input seal (item 27). Install seal into gearbox bore taking care to not damage seal during installation. Seal should be installed until it is flush to slightly recessed into gearbox bore.